



THE
STUDY OF MEDICINE.

BY JOHN MASON GOOD,

M. D. F. R. S. F. R. S. L.

MEM. AM. PHIL. SOC. AND F. L. S. OF PHILADELPHIA.

CONTAINING ALL
THE AUTHOR'S FINAL CORRECTIONS AND IMPROVEMENTS.

From the last London Edition,

WITH

MUCH ADDITIONAL MODERN INFORMATION ON PHYSIOLOGY, PRACTICE,
PATHOLOGY, AND THE NATURE OF DISEASES IN GENERAL.

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ADVERTISEMENT

TO THE LAST EDITION.

WHEN the learned and very distinguished author of the "Study of Medicine," much to the regret of every lover of talent and worth, went to that bourn from which no traveller returns, he had already advanced a considerable way in preparations for the present edition. This was so much the case, that he had revised all the five volumes, and introduced into them a great number of observations, tending to augment their utility and correctness. Various parts of the work, however, still demanded farther attention, and none more so than its surgical articles. The author's bad health had, indeed, materially interfered with his laudable and anxious wish to bring the corrections down to the latest period, and to omit nothing that was new, and, at the same time, truly valuable.

In the humble attempt which I have made to improve a work, already honoured with extensive approbation and high reputation, my chief fear has been that of exceeding the bounds within which every discreet editor ought to confine himself. On this account, I have not presumed to encroach much upon the author's plan, which, whatever may be the defects in its execution, rests upon a solid foundation, and has the pleasing recommendation of originality. But although, with few exceptions, the arrangement of the subjects treated of has not been changed, I have sometimes ventured to express reasons for thinking some of them misplaced. With the same frankness, I have also stated the considerations, which have now and then inclined me not to adopt precisely the views entertained by the author on certain points in physiology, pathology, and the treatment of diseases. As far as my knowledge

extends, no celebrated writers on medicine have yet been able completely to avoid hypothesis; and, if the present author occasionally soar into the regions of conjecture, he has only imitated all the greatest of his predecessors. For such flights, every man conscious of the difficulties of medical science, and aware of the zeal, perseverance, and active mind of the late Dr. Good, will readily find an excuse. If the general tenor of his book be good; if, indeed (what seems to me to be the fact), it be so excellent, that no other modern system is, on the whole, half so valuable as the "Study of Medicine," its imperfections will be indulgently disregarded by every liberal critic, and its genuine merit warmly admired.

In closing this short address, it is proper to mention, that the new matter, which I have taken the liberty to incorporate in the text, is marked in such a manner, that the reader will immediately perceive the passages, for which my own character, and not that of Dr. Good, is responsible. The notes now introduced have the word "Editor" annexed to them.

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PREFACE

TO THE FIRST EDITION.

THE object of the present work is to unite the different branches of medical science, which, when carried to any considerable extent, have hitherto, by most writers, been treated of separately, into a general system, so that the whole may be contemplated under a single view, and pursued under a common study. These branches are the following :

- I. **PHYSIOLOGY**, or the doctrine of the natural action of the living principle.
- II. **PATHOLOGY**, or the doctrine of its morbid action.
- III. **NOSOLOGY**, or the doctrine of the classification of diseases.
- IV. **THERAPEUTICS**, or the doctrine of their treatment and cure.

All these are of high, if not of equal importance. As it is impossible for a workman to set about restoring a machine to order, with any rational hope of success, without knowing the full extent and nature of the injury it has sustained, so is it equally impossible for him to acquire this knowledge, unless he has also a knowledge of the structure of the machine, and has studied its several parts methodically, and in reference to the bearing which one part has upon another.

It is this advantage of the study of one part in relation to another that constitutes, or should constitute, in the art of medicine, the basis of **NOSOLOGICAL ARRANGEMENT**; for by grouping diseases, not arbitrarily, but in the order of connexion in which they make their appearance in different functions, and the organs on which those functions depend, it is almost impossible to obtain an insight into the nature of any one disease belonging to such groups, without obtaining some insight into the nature of the rest, or tracing out some of the laws of morbid action which are common to the whole.

If it be convenient to concentrate the diseases of the nervous department into one division, as has been attempted by many nosologists, and ably accomplished by Dr. Cullen, it is to be lamented that the same principle has not been allowed to pervade the whole of the nosological plan; and that the diseases of the other chief departments of the animal frame have not been concentrated in the same way, instead of being scattered, as we too often find them, over different divisions of a classification that is itself perpetually shifting from one ground of arrangement to another: which in one division, as in the Synopsis of Dr. Cullen, by far the best of his day, is derived from the temperature of the body; in a second, from its anatomical structure; in a third, from its chemical depravities; and in a fourth, from its topography: thus offering us in each division a new principle, and one that has no common clew, or analogy with the rest.

It was the hope of obtaining a clearer and more connected method than had hitherto been studied in the schools of medicine, that induced the present author to turn his attention to this subject many years ago, and at length enabled him to submit to the public a System of Nosology, founded entirely on a physiological basis, in which the diseases of the respective functions of the animal frame are connected in classes derived from those functions, and follow each other in the order in which physiologists have usually treated of them.

It was not, however, from a mere hope of obtaining a more exact and comprehensive synopsis of diseases that the author was induced to undertake this new arrangement, but with a view of employing it as a text-book for the collateral branches of the Art of Healing already adverted to, as soon as he should find leisure to enter upon them, and to which no other synopsis he was acquainted with seemed equally adapted.

This work was published in the beginning of 1817, under the title of a "Physiological System of Nosology, with a corrected and simplified Nomenclature;" and the favourable opinion, which has been formed of it; its adoption as a text-book in various medical schools of high reputation in our own

country, and on the Continent; the application which has been made to the author by some of the oldest and most established lecturers of this metropolis to print a syllabus of its classification for the purpose of lecturing from; and, above all, the approbation which the Royal College of Physicians has bestowed upon it, by permitting it to be dedicated to that learned body, after having been circulated amidst the Fellows of the College, under an express order of the late President, for an examination of its contents by every individual at his own house, are, he trusts, a sufficient apology for his adhering to his original intention, and taking this system, instead of any other, as the ground-work of the ensuing arrangement.

It is not necessary in the present place to enter into a minute explanation of the subordinate parts of this system, nor of the occasional changes in medical nomenclature which are to be found in it; and which a close attention to correctness and simplicity seemed to render indispensable. All these are fully illustrated in the Preliminary Dissertation to the volume of Nosology, which the author is desirous of having regarded as a part of the general design. An alteration in the distribution of one or two of the diseases, as originally laid down, may be noticed by an attentive eye in the present volumes. They are changes which have been made out of deference to the opinions of others, or from a maturer consideration of the subject by the author himself: but, upon the whole, they are too few and of too little importance to render it necessary to indicate them in the present place.

A pretty active spirit of *PHYSIOLOGY* will be found to pervade the entire work; but the author has, beyond this, availed himself of the advantage which his arrangement so readily allows, of prefixing to every class a summary of the most important laws and interesting discoveries of physiology that relate to, or can elucidate, the subjects which constitute its scope. And he has occasionally enriched the dissertation by a glance at the more striking analogies of the animal and even of the vegetable world at large, wherever they could add to the illustration.

In the **PATHOLOGICAL DEPARTMENT**, if the reader meet with an occasional development of new principles, a question as to several that have been long before the public, or a farther extension of many that are well established, the author trusts that whatever doctrines are advanced will, at least, be found true to themselves, and form a digested system, operating in accordance through the entire work, in what way soever they may be affected by future investigations. He trusts it will also be found, that nothing is newly started for the mere sake of novelty, or controverted from a mere love of disputation : and that, whenever it has been his misfortune to differ from high authorities which have preceded him, he has done it with the candour which should peculiarly characterize a liberal profession. His main object has been to explain to the student the different subjects that pass before him, and to illustrate them by analogies, instead of confining himself to a dry and wearisome history of morbid symptoms and operations.

In **THERAPEUTICS** the author has allowed himself a liberal range, and has, occasionally introduced into his *Materia Medica*, substances that are highly esteemed abroad, though little valued or even known at home, or that seem, without reason, to have fallen into temporary disrepute. There are some practitioners who think that all the articles which are of real use in the cure of diseases lie within a small compass, and may be learnt without burthening the memory. This remark may be allowed to those who are limited to a portable dispensary, as in travelling, or on shipboard ; but when uttered under other circumstances, it savours less of wisdom, than of indolence. If the pharmacopœias of former times were too voluminous, and were occasionally loaded with medicines of trifling importance, the lopping and topping that must hereupon ensue would make a destructive inroad upon their boundaries, and take from them much that is good as well as something that can be spared. We may easily, indeed, substitute one medicine for another, but it is very rarely that we can hereby obtain an integral representative ; a remedy, possessing not only the general but the particular qualities of that whose place is supplied, so as to be equally adapted to the exact state of the disease or the express character of the idiosyncrasy. Sir

George Baker was engaged as reasonably and scientifically in examining into the virtues of the *cardamine pratensis*, or lady's smock, as Dr. Stoerck in proving, upon his own person, the violent powers of *colchicum* and *stramonium*. A common fate has, indeed, attended the whole of these experiments. From attracting and concentrating the attention of the public, the medicines to which they were directed became equally over-valued; were employed upon all occasions; produced frequent disappointment; and gradually fell into disuse. The *colchicum* has been fortunate enough to ascend once more to its full zenith of popularity; many efforts have been made on behalf of the *stramonium*; and the *cardamine*, though at present less successful than either of the others, still holds in abeyance its post in the established pharmacopœias, waiting for some lucky trial to bring it once more into general esteem.

A work, erected upon scientific principles, should know nothing of these accidental reverses, and still less of the varying and too often capricious taste of the day. To judge by the sentiments of some writers, the reputation of the bark seems at present on the wane, while the seeds of the *croton tiglium*, after a long neglect, are again rising into notice. In the remedial part of the present work, the author has endeavoured to allow to every medicine its proper value, as far as he has been able to estimate it, whatever may have been the era of its credit; and as there can be no stronger ground for the study of botany, oryctology, or chemistry, than the advantage they afford to the art of healing, and as these are provinces cultivated in our own day by almost every one, he has felt himself called upon by the general voice of the times to range with some latitude over the medicinal stores afforded by art and nature, and to discriminate the respective properties of each, rather than to limit himself to a few leading productions, or to refer to the whole under the general divisions of stimulants, sedatives, and cathartics, or whatever other names may serve for a medicinal classification.

It is this, indeed, that after all must chiefly constitute the THERAPIA, or PRACTICE OF MEDICINE, to which every thing

else, though of the utmost moment, is but introductory. "The First Lines" of Dr. Cullen, when read, as they were delivered, in connexion with his "Treatise on the Materia Medica," constitute the most important course of instruction that has ever, perhaps, been laid down and completed by the same individual. But, for this purpose, they must be read together, though they were not published together, nor for the express design of forming a contemporaneous study : for it is a singular fact, that the First Lines of the Practice of Physic, though full both of mind and of matter, of elaborate axioms and theoretical principles, contain little of what the title suggests ; while the Treatise on the Materia Medica, without making any pretensions to the subject, is altogether a practical work, replete with practical principles, and founded upon a practical investigation.

Whatever may be the theory or the practice advanced in the ensuing volumes, the author will generally be found to leave nothing upon trust ; but to support or illustrate his assertions by authorities which he has endeavoured to give, with some degree of copiousness, from ancient as well as modern times : so as to render the work in a certain sense a summary of the general history of medicine in most ages and countries.

To the labours of our own countrymen, however, he professes to be chiefly indebted for his supplies : to the illustrious dead and to the illustrious living : to all of whom he has conscientiously endeavoured to do justice, even where he has been under the misfortune of differing from any of them in opinion. With the former he can have no controversy ; and, with the latter, he has taken the most gratifying means of avoiding it, and at the same time, of adding considerably to the value of his work, by submitting to the most distinguished of them, and especially to those with whom he has the honour of a personal acquaintance, the successive sheets of the work, while passing through the press, that contain a notice of their respective opinions or publications ; with a request that they would correct any incidental mis-statement, or communicate any valuable

hint that may since have occurred to them on the subject. It would occupy too much space to enumerate all the individuals to whom the author has been indebted for assistance of this kind : but there are several whose names the public ought to be made acquainted with, as adding, in no ordinary degree, to the authority of the work itself.

He has, in the first place, to return his very grateful thanks to the President of the Royal College of Physicians, without whose fostering encouragement his health and strength, considerably encroached upon by the laborious and unremitting study with which it has been necessary to prosecute the subject, would hardly have held out to its close ; and who has not only taken the trouble of examining the sheets that relate to his own valuable labours, but of watching the progress of the work generally, and of perusing many parts of it as they have issued from the press. He has next to offer his acknowledgments to his highly distinguished and venerable friend Dr. Perceval, of Dublin ; who has been so kind as to favour him with a valuable manuscript series of notes, in the form of a running commentary, upon the entire volume of Nosology, in illustration of its definitions or opinions ; the whole of which will be found embodied into the present work, with a reference to the real author in every instance. To the liberality of Sir James M'Grigor he is indebted for important assistance on several occasions, and particularly for his munificent offer of a free and facilitated access to all the medical documents of the army, addressed to him as Director-General. To his kind friend, Sir John Webb, he is also largely indebted for similar assistance from the Ordnance Department, and particularly in respect to the subject of plague, upon which he has proved himself to be so perfectly conversant. The kindness of Dr. Baillie can never be erased from the author's memory, but he has particularly to thank him on the present occasion for reviewing the article on spasmodic stricture of the rectum as well as several others, which, without his previous labours, would not perhaps have been found in the present work, or have been found but very imperfectly. To Dr. Latham he is under obligations on various accounts ; but, in the present work,

he is especially indebted to him for his friendly revision of the article *paruria mellita*, or *diabetes*. The volumes will display abundant instances in which he has derived assistance from the comprehensive mind of Sir Gilbert Blane, but the friendliness with which he has consented to furnish him with a description of his own case, in a very singular and obstinate attack of prurigo, and to revise the statement when printed, demands an especial acknowledgment. To Dr. Bree the author is indebted for perusing the article on asthma, and his very liberal opinion on the same. To Dr. Young for a like attention to that on phthisis, and the valuable hints with which his opinion was accompanied. To Dr. Cooke, whose friendship he has experienced in many important instances, he is under a similar obligation for perusing, and, in a few instances, correcting the account of apoplexy and palsy : and to his excellent and judicious friend Dr. James Johnson, for various hints concerning tropical diseases, and a perusal of some parts of the present volumes in which they are treated of.

The author has entered with a considerable degree of fullness into the different modifications of diseases, in order to adapt the work to foreign climates and stations as well as to domestic practice : for a system of medicine, to be complete, should be of universal application. To render it such, however, it is seldom necessary to do more than follow up the common diseases of a country into their respective varieties : for the general laws of the morbid action of the living principle are as permanent and universal as those of its natural action, and a really new SPECIES of disease is, perhaps, as much a phenomenon as a really new species of plant or animal. We see all these infinitely diversified by accidental circumstances, and particularly the circumstances of habit and climate ; but the specific outlines are still preserved, and we are still capable of reducing them, under every disguise, to their proper relations, and of assigning them their proper posts. From a few nondescript skeletons occasionally found in the bowels of the earth, and particularly from the interesting museum of such established by M. Cuvier at Paris, we have reason to believe that a few species of animals have totally disap-

peared ; as we have also, from the classifications of recent naturalists compared with those of earlier times, that a few species are now in being which had no existence in remote ages. And in like manner, whilst a few species of diseases are now no longer to be found which are described by earlier writers, a few seem to have supplied their place, which are comparatively of modern origin. Yet, upon the whole, the march of nature is but little interfered with in either case ; and hence the prognostics and aphorisms of Hippocrates, the medical histories of Aretæus and Galen, of Rhazes and Avicenna, and the natural histories of Aristotle and Pliny, are transcripts of animal life in our own day, as well as in the times in which they were severally composed ; and form important subjects of modern, as it is well known they did of ancient study. The extensive family of fevers and spasmodic affections are, in the main, the same now as they are represented in the most ancient writings that have descended to us ; the plague of Athens, as described by Thucydides, we shall find in the ensuing pages to be the prototype of what still occasionally takes place in Egypt and along the Barbary coast ; and even the leprosy of the Levitical law, so minutely described by Moses, will be found, when the passage is closely and accurately rendered, still to retain its hold in the East, and to exhibit even the very same modifications as are noticed by the Hebrew legislator, and have been intermediately assigned to it by Celsus.

TABLE OF CLASSIFICATION.

CLASS I. CÆLIACA.

DISEASES OF THE DIGESTIVE FUNCTION.

ORD. I. ENTERICA.

AFFECTING THE ALIMENTARY CANAL.

GEN. I. ODONTIA.

Misdentition.

- Spec. 1. O. Dentitionis. *Teething.*
2. Dolorosa. *Tooth-ach.*
3. Stuporis. *Tooth-edge.*
4. Deformis. *Deformity of Teeth.*
5. Edentula. *Toothlessness.*
6. Incrustans. *Tartar of the Teeth.*
7. Excrescens. *Excrescent Gums.*

GEN. II. PTYALISMUS.

Ptyalism.

- Spec. 1. P. Acutus. *Salivation.*
2. Iners. *Drivelling.*

GEN. III. DYSPHAGIA.

Dysphagy.

- Spec. 1. D. Constricta.
Constrictive Dysphagy.
2. Atonica. *Atonic Dysphagy.*
3. Globosa. *Nervous Quinsy.*
4. Uvulosa. *Uvular Dysphagy.*
5. Linguosa. *Lingual Dysphagy.*

GEN. IV. DIP SOSIS.

Morbid Thirst.

- Spec. 1. D. Avens.
Immoderate Thirst.
2. Expers. *Thirstlessness.*

GEN. V. LIMOSIS.

Morbid Appetite.

- Spec. 1. L. Avens. *Voracity.*
2. Expers. *Long Fasting.*
3. Pica. *Depraved Appetite.*
4. Cardialgia. *Heart-burn. Water-brash. Cardialgy.*
5. Flatus. *Flatulency.*

6. Emesis. *Sickness. Vomiting.*

7. Dyspepsia. *Indigestion.*

GEN. VI. COLICA.

Colic.

- Spec. 1. C. Ileus. *Ileac Passion.*
2. Rhachialgia. *Colic of Poitou. Painter's Colic.*
3. Cibaria. *Surfeit.*
4. Flatulenta. *Wind-Colic.*
5. Constipata. *Constipated Colic.*
6. Constricta. *Constrictive Colic.*

GEN. VII. COPROSTASIS.

Costiveness.

- Spec. 1. C. Constipata. *Constipation.*
2. Obstipata. *Obstipation.*

GEN. VIII. DIARRHŒA.

Looseness.

- Spec. 1. D. Fusa.
Feculent Looseness.
2. Biliosa. *Bilious Looseness.*
3. Mucosa. *Mucous Looseness.*
4. Alba. *White Looseness.*
5. Lienteria. *Lientery.*
6. Serosa. *Serous Looseness.*
7. Tubularis. *Tubular Looseness.*

GEN. IX. CHOLERA.

Cholera.

- Spec. 1. C. Biliosa. *Bilious Cholera.*
2. Flatulenta. *Wind Cholera.*
3. Spasmodica.
Spasmodic Cholera.

GEN. X. ENTEROLITHUS.

Intestinal Concretions.

- Spec. 1. E. Bezoardus. *Bezoar.*
2. Calculus. *Intestinal Calculus.*
3. Scybalum. *Scybalum.*

GEN. XI. HELMINTHIA.
Worms.

- Spec. 1. H. Alvi. *Alvine Worms.*
2. Podicis. *Anal Worms.*
3. Erratica. *Erratic Worms.*

GEN. XII. PROCTICA.
Proctica.

- Spec. 1. P. Spasmodica. *Spasmodic Stricture of the Rectum.*
2. Callosa. *Callous Stricture of the Rectum.*
3. Tenesmus. *Tenesmus.*
4. Marisca. *Piles.*
5. Exania.
Prolapse of the Fundament.

ORD. II. SPLANCHNICA.
AFFECTING THE COLLATITIOUS VISCERA.

GEN. I. ICTERUS.
Yellow Jaundice.

- Spec. 1. I. Cholæus.
Biliary Jaundice.
2. Chololithicus.
Gall-stone Jaundice.
3. Spasmodicus.
Spasmodic Jaundice.

4. Hepaticus. *Hepatic Jaundice.*
5. Infantum. *Jaundice of Infants.*

GEN. II. MELÆNA.
Melena.

- Spec. 1. M. Cholæa.
Black, or Green Jaundice.
2. Cruenta. *Black Vomit.*

GEN. III. CHOLOLITHUS.
Gall-stone.

- Spec. 1. C. Quiescens.
Quiescent Gall-stone.
2. Means. *Passing of Gall-stones.*

GEN. IV. PARABYSMA.
Visceral Turgescence.

- Spec. 1. P. Hepaticum.
Turgescence of the Liver.
2. Splenicum.
Turgescence of the Spleen.
3. Pancreaticum.
Turgescence of the Pancreas.
4. Mesentericum.
Turgescence of Mesentery.
5. Intestinale.
Turgescence of the Intestines.
6. Omentale.
Turgescence of the Omentum.
7. Complicatum. *Turgescence compounded of various organs.*

CLASS II. PNEUMATICA.

DISEASES OF THE RESPIRATORY FUNCTION.

ORD. I. PHONICA.
AFFECTING THE VOCAL AVENUES.

GEN. I. CORYZA.
Running at the Nose.

- Spec. 1. C. Antonica.
Antonic Coryza.
2. Atonica. *Atonic Coryza.*

GEN. II. POLYPUS.
Polypus.

- Spec. 1. P. Elasticus.
Compressible Polypus.
2. Coryaceus.
Cartilaginous Polypus.

GEN. III. RHONCHUS.
Rattling in the Throat.

- Spec. 1. R. Stertor. *Snoring.*
2. Cerchinos. *Wheezing.*

GEN. IV. APHONIA.
Dumbness.

- Spec. 1. A. Elinguium.
Elingual Dumbness.
2. Atonica. *Atonic Dumbness.*
3. Surdorum. *Deaf Dumbness.*

GEN. V. DYSPHONIA.
Dissonant Voice.

- Spec. 1. D. Susurrans.
Whispering Voice.

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| Spec. 2. Puberum. <i>Voice of Puberty.</i> 3. Immodulata. <i>Immelodious Voice.</i> | Spec. 1. D. Chronica. <i>Short-breath.</i> 2. Exacerbans. <i>Exacerbating Anhelation.</i> |
| GEN. VI. PSELLISMUS. <i>Dissonant Speech.</i> | GEN. IV. ASTHMA. <i>Asthma.</i> |
| Spec. 1. P. Bambalia. <i>Stammering.</i> 2. Blæsitæ. <i>Mispronunciation.</i> | Spec. 1. A. Siccum. <i>Dry or Nervous Asthma.</i> 2. Humidum. <i>Humid or common Asthma.</i> |
| ORD. II. PNEUMONICA. AFFECTING THE LUNGS, THEIR MEMBRANES, OR MOTIVE POWER. | GEN. V. EPHIALTES. <i>Incubus.</i> |
| GEN. I. BEX. <i>Cough.</i> | Spec. 1. E. Vigilantium. <i>Day-Mare.</i> 2. Nocturnus. <i>Night-Mare.</i> |
| Spec. 1. B. Humida. <i>Common or humid Cough.</i> 2. Sicca. <i>Dry Cough.</i> 3. Convulsiva. <i>Whooping-Cough.</i> | GEN. VI. STERNALGIA. <i>Suffocative Breast-Pain.</i> |
| GEN. II. LARYNGYSMUS. <i>Laryngeal Suffocation.</i> | Spec. 1. S. Ambulantium. <i>Acute Breast-pain.</i> 2. Chronica. <i>Chronic Breast-pain.</i> |
| Spec. 1. L. Stridulus. <i>Stridulous Constriction of the Larynx.</i> | GEN. VII. PLEURALGIA. <i>Pain in the Side.</i> |
| GEN. III. DYSPNŒA. <i>Anhelation.</i> | Spec. 1. P. Acuta. <i>Stitch.</i> 2. Chronica. <i>Chronic pain in the Side.</i> |

CLASS III. HÆMATICA.

DISEASES OF THE SANGUINEOUS FUNCTION.

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| ORD. I. PYRECTICA. FEVERS. | 2. Tertianus. <i>Tertian Ague.</i> 3. Quartanus. <i>Quartan Ague.</i> 4. Erraticus. <i>Irregular Ague.</i> 5. Complicatus. <i>Complicated Ague.</i> |
| GEN. I. EPHEMERA. <i>Diary Fever.</i> | GEN. III. EPANETUS. <i>Remittent Fever.</i> |
| Spec. 1. E. Mitis. <i>Mild Diary Fever.</i> 2. Acuta. <i>Acute Diary Fever.</i> 3. Sudatoria. <i>Sweating Fever.</i> | Spec. 1. E. Mitis. <i>Mild Remittent.</i> 2. Malignus. <i>Malignant Remittent.*</i> 3. Hecticus. <i>Hectic Fever.</i> |
| GEN. II. ANETUS. <i>Intermitting Fever. Ague.</i> | GEN. IV. ENECIA. <i>Continued Fever.</i> |
| Spec. 1. A. Quotidianus. <i>Quotidian Ague.</i> | |

* α Autumnal Remittent. β Yellow Fever. γ Burning Remittent. δ Asthenic Remittent.

- Spec. 1. E. Cauma.
Inflammatory Fever.
 2. Typhus. *Typhous Fever.*
 3. Synochus. *Synochal Fever.*

ORD. II. PHLOGOTICA.

INFLAMMATIONS.

GEN. I. APOSTEMA.

Aposteme.

- Spec. 1. A. Commune.
Common Aposteme.
 2. Psoaticum. *Psoas Abscess.*
 3. Hepaticum. *Abscess of the Liver.*
 4. Empyema. *Lodgment of Matter in the Chest.*
 5. Vomica. *Vomica.*

GEN. II. PHLEGMONE.

Phlegmon.

- Spec. 1. P. Communis.
Common Phlegmon.
 2. Parulis. *Gum-boil.*
 3. Parotideæ. *Parotid Phlegmon.*
 4. Mammæ. *Abscess of the Breast.*
 5. Bubo. *Bubo.*
 6. Phimotica. *Phimotic Phlegmon.*

GEN. III. PHYMA.

Tuber.

- Spec. 1. P. Hordeolum. *Sty.*
 2. Furunculus. *Boil.*
 3. Sycosis. *Ficous Phyma.*
 4. Anthrax. *Carbuncle.*

GEN. IV. IONTHUS.

Whelk.

- Spec. 1. I. Varus. *Stone-Pock.*
 2. Corymbyfer. *Carbuncled Face.*
Rosy Drop.

GEN. V. PHLYSIS.

Phlysis.

- Spec. 1. P. Paronychia. *Whitlow.*

GEN. VI. ERYTHEMA.

Inflammatory Blush.

- Spec. 1. E. Cedematosum.
Edematous Erythema.
 2. Erysipelatosum.
Erysipelatous Erythema.

Spec. 3. Gangrænosum.

Gangrenous Erythema.

4. Vesiculare. *Vesicular Erythema.*
 5. Anatomicum.
Erythema from Dissection.
 6. Pernio. *Chilblain.*
 7. Intertrigo. *Fret.*

GEN. VII. EMPRESMA.

Visceral Inflammation.

- Spec. 1. E. Cephalitis.
*Inflammation of the Brain.**
 2. Otitis. *Ear-ach.*
 3. Parotitis. *Mumps.*
 4. Paristhmitis. *Quinsy.*
 5. Laryngitis.
Inflammation of the Larynx.
 6. Bronchleumitis. *Croup.*
 7. Pneumonitis. *Peripneumony.*
 8. Pleuritis. *Pleurisy.*
 9. Carditis.
Inflammation of the Heart.
 10. Peritonitis. *Inflammation of the Peritonæum.*
 11. Gastritis.
Inflammation of the Stomach.
 12. Enteritis.
Inflammation of the Bowels.
 13. Hepatitis.
Inflammation of the Liver.
 14. Splenitis.
Inflammation of the Spleen.
 15. Nephritis.
Inflammation of the Kidneys.
 16. Cystitis.
Inflammation of the Bladder.
 17. Hysteritis.
Inflammation of the Womb.
 18. Orchitis.
Inflammation of the Testicles.

GEN. VIII. OPHTHALMIA.

Ophthalmy.

- Spec. 1. Ophthalmitis. *Inflammation of the whole Eye-ball.*
 2. Externa. *Inflammation of the External Tunics.*
 3. Interna. *Inflammation of the Internal Parts of the Eye.*
 4. Staphyloma. *Protuberant Eye.*
 5. Ectropium. *Everted Eye-lid.*
 6. Entropium. *Inverted Eye-lid.*

GEN. IX. CATARRHUS.

Catarrh.

- Spec. 1. C. Communis.
Cold in the Head or Chest.
 2. Epidemicus. *Influenza.*

GEN. X. DYSENTERIA.

Dysentery.

- Spec. 1. D. Acuta. *Acute Dysentery.*
 2. Chronica. *Chronic Dysentery.*

GEN. XI. BUCNEMIA.

Tumid Leg.

- Spec. 1. B. Sparganosis.
Puerperal tumid Leg.
 2. Tropica.
Tumid Leg of hot Climates.

GEN. XII. ARTHROSIA.

Articular Inflammation.

- Spec. 1. A. Acuta.
Acute Rheumatism.
 2. Chronica. *Chronic Rheumatism.*
 3. Podagra. *Gout.*
 4. Hydarthrus. *White-swelling.*

ORD. III. EXANTHEMA-TICA.

ERUPTIVE FEVERS. EXANTHEMS.

GEN. I. ENANTHESIS.

Rash Exanthem.

- Spec. 1. E. Rosalia. *Scarlet Fever.*
 2. Rubeola. *Measles.*
 3. Urticaria. *Nettle Rash.*

GEN. II. EMPHLYSIS.

Ichorous Exanthem.

- Spec. 1. E. Miliaria. *Miliary Fever.*
 2. Aphtha. *Thrush.*
 3. Vaccinia. *Cow-Pox.*
 4. Varicella. *Water Pox.*
 5. Pemphigus.
Vesicular, or Bladdery Fever.
 6. Erysipelas. *St. Anthony's Fire.*

GEN. III. EMPYESIS.

Pustulous Exanthem.

- Spec. 1. E. Variola. *Small-Pox.*

GEN. IV. ANTHRACIA.

Carbuncular Exanthem.

- Spec. 1. A. Pestis. *Plague.*
 2. Rubula. *Yaws.*

ORD. IV. DYSTHETICA.

CACHEXIES.

GEN. I. PLETHORA.

Plethora.

- Spec. 1. P. Entonica.
Sanguine Plethora.
 2. Atonica. *Serous Plethora.*

GEN. II. HÆMORRHAGIA.

Hemorrhage.

- Spec. 1. H. Entonica.
Entonic Hemorrhage.
 2. Atonica. *Atonic Hemorrhage.*

GEN. III. MARASMUS.

Emaciation.

- Spec. 1. M. Atrophia. *Atrophy.*
 2. Anhæmia. *Exsanguinity.*
 3. Climactericus. *Decay of Nature.*
 4. Tabes. *Decline.*
 5. Phthisis. *Consumption.*

GEN. IV. MELANOSIS.

Melanose.

- Spec. 1. M. Tubercularis.
Tubercular Melanose.

GEN. V. STRUMA.

Scrophula.

- Spec. 1. S. Vulgaris. *King's Evil.*

GEN. VI. CARCINUS.

Cancer.

- Spec. 1. C. Vulgaris.
Common Cancer.

GEN. VII. LUES.

Venereal Disease.

- Spec. 1. L. Syphilis. *Pox.*
 2. Syphilodes. *Bastard Pox.*

GEN. VIII. ELEPHANTIASIS.

Elephant Skin.

- Spec. 1. E. Arabica. *Arabian Elephantiasis. Black Leprosy.*
 2. Italica. *Italian Elephantiasis.*
 3. Asturiensis.
Asturian Elephantiasis.

GEN. IX. CATACAUSIS.
Catacausis.

- Spec. 1. C. Ebriosa.
Inebriate Catacausis.

GEN. X. PORPHYRA.
Scurvy.

- Spec. 1. P. Simplex.
Petechial Scurvy.
 2. Hæmorrhagia. *Land Scurvy.*
 3. Nautica. *Sea Scurvy.*

GEN. XI. EXANGIA.
Exangia.

- Spec. 1. E. Aneurisma. *Aneurism.*

- Spec. 2. E. Varix. *Varix.*
 3. Cyenia. *Blue-skin.*

GEN. XII. GANGRÆNA.
Gangrene.

- Spec. 1. G. Sphacelus. *Mortification.*
 2. Ustilaginea.
Mildew Mortification.
 3. Necrosis. *Dry Gangrene.*
 4. Caries. *Caries.*

GEN. XIII. ULCUS.
Ulcer.

- Spec. 1. U. Incarnans.
Simple healing Ulcer.
 2. Vitiosum. *Depraved Ulcer.*
 3. Sinuosum. *Sinuous Ulcer.*
 4. Tuberculosum.
Warty excrescent Ulcer.
 5. Cariosum. *Carious Ulcer.*

CLASS IV. NEUROTICA.

DISEASES OF THE NERVOUS FUNCTION.

ORD. I. PHRENICA.
 AFFECTING THE INTELLECT.

GEN. I. ECPHRONIA.
Insanity. Crazyiness.

- Spec. 1. E. Melancholia. *Melancholy.*
 2. Mania. *Madness.*

GEN. II. EMPATHEMA.
Ungovernable Passion.

- Spec. 1. E. Entonicum.
Empassioned Excitement.
 2. Atonicum.
Empassioned Depression.
 3. Inane. *Hare-brained Passion.*

GEN. III. ALUSIA.
Illusion. Hallucination.

- Spec. 1. A. Elatio. *Sentimentalism.*
Mental Extravagance.
 2. Hypochondrias. *Hypochondrism.*
Low Spirits.

GEN. IV. APHELXIA.
Revery.

- Spec. 1. A. Socors.
Absence of Mind.

- Spec. 2. Intenta. *Abstraction of Mind.*
 3. Otiosa. *Brown Study.*

GEN. V. PARONIRIA.
Sleep Disturbance.

- Spec. 1. P. Ambulans.
Sleep-walking.
 2. Loquens. *Sleep-talking.*
 3. Salax. *Night Pollution.*

GEN. VI. MORIA.
Fatuity.

- Spec. 1. M. Imbecilis. *Imbecility.*
 2. Demens. *Irrationality.*

ORD. II. ÆSTHETICA.
 AFFECTING THE SENSATION.

GEN. I. PAROPSIS.
Morbid Sight.

- Spec. 1. P. Lucifuga. *Night-Sight.*
 2. Noctifuga. *Day-Sight.*
 3. Longinqua. *Long-Sight.*
 4. Propinqua. *Short-Sight.*
 5. Lateralis. *Skue-Sight.*
 6. Illusoria. *False-Sight.*

- Spec. 7. Caligo. *Opake Cornea.*
 8. Glaucosis. *Humoral Opacity.*
 9. Cataracta. *Cataract.*
 10. Synizesis. *Closed Pupil.*
 11. Amaurosis. *Drop Serene.*
 12. Strabismus. *Squinting.*

GEN. II. PARACUSIS.

Morbid Hearing.

- Spec. 1. P. Acris. *Acrid Hearing.*
 2. Obtusa. *Hardness of Hearing.*
 3. Perversa. *Perverse Hearing.*
 4. Duplicata. *Double Hearing.*
 5. Illusoria. *Imaginary Sounds.*
 6. Surditas. *Deafness.*

GEN. III. PAROSMIS.

Morbid Smell.

- Spec. 1. P. Acris. *Acrid Smell.*
 2. Obtusa. *Obtuse Smell.*
 3. Experts. *Want of Smell.*

GEN. IV. PARAGEUSIS.

Morbid Taste.

- Spec. 1. P. Acris. *Acrid Taste.*
 2. Obtusa. *Obtuse Taste.*
 3. Experts. *Want of Taste.*

GEN. V. PARAPSIS.

Morbid Touch.

- Spec. 1. P. Acris. *Acrid Sense of Touch or general Feeling.*
 2. Experts. *Insensibility of Touch or general Feeling.*
 3. Illusoria. *Illusory Sense of Touch or general Feeling.*

GEN. VI. NEURALGIA.

Nerve-ach.

- Spec. 1. N. Faciei. *Nerve-ach of the Face.*
 2. Pedis. *Nerve-ach of the Foot.*
 3. Mammæ. *Nerve-ach of the Breast.*

ORD. III. CINETICA.

AFFECTING THE MUSCLES.

GEN. I. ENTASIA.

Constrictive Spasm.

- Spec. 1. E. Priapismus. *Priapism.*
 2. Loxia. *Wry-neck.*
 3. Rhachybia. *Muscular Distortion of the Spine.*
 4. Articularis. *Muscular Stiff-joint.*

Spec. 5. Systremma. *Cramp.*

6. Trismus. *Locked-jaw.*
 7. Tetanus. *Tetanus.*
 8. Lyssa. *Rabies. Canine Madness.*
 9. Acrotismus. *Suppressed Pulse.*

GEN. II. CLONUS.

Clonic Spasm.

- Spec. 1. C. Singultus. *Hiccough.*
 2. Sternutatio. *Sneezing.*
 3. Palpitatio. *Palpitation.*
 4. Nictitatio. *Twinkling of the Eye-lids.*
 5. C. Subsultus. *Twitching of the Tendons.*
 6. Pandiculatio. *Stretching.*

GEN. III. SYNCLONUS.

Synclonic Spasm.

- Spec. 1. S. Tremor. *Trembling.*
 2. Chorea. *St. Vitus's Dance.*
 3. Ballismus. *Shaking Palsy.*
 4. Raphania. *Raphania.*
 5. Beriberia. *Barbiers.*

ORD. IV. SYSTATICA.

AFFECTING SEVERAL OR ALL THE SENSORIAL POWERS SIMULTANEOUSLY.

GEN. I. AGRYPNIA.

Sleeplessness.

- Spec. 1. A. Excitata. *Irritative Wakefulness.*
 2. Pertæsa. *Chronic Wakefulness.*

GEN. II. DYSPHORIA.

Restlessness.

- Spec. 1. D. Simplex. *Fidgets.*
 2. Anxietas. *Anxiety.*

GEN. III. ANTIPATHIA.

Antipathy.

- Spec. 1. A. Sensilis. *Sensile Antipathy.*
 2. Insensilis. *Insensile Antipathy.*

GEN. IV. CEPHALÆA.

Head-Ach.

- Spec. 1. C. Gravans. *Stupid Head-ach.*
 2. Intensa. *Chronic Head-ach.*
 3. Hemicrania. *Megrim.*
 4. Pulsatilis. *Throbbing Head-ach.*
 5. Nauseosa. *Sick Head-ach.*

GEN. V. DINUS.

*Dizziness.*Spec. 1. D. Vertigo. *Vertigo.*

GEN. VI. SYNCOPE.

*Syncope.*Spec. 1. S. Simplex. *Swooning.*2. Recurrens. *Fainting-fit.*

GEN. VII. SYSPASIA.

*Comatose Spasm.*Spec. 1. S. Convulsio. *Convulsion.*Spec. 2. Hysteria. *Hysterics.*3. Epilepsia. *Epilepsy.*

GEN. VIII. CARUS.

*Torpor.*Spec. 1. C. Asphyxia. *Asphyxy.*
*Suspended Animation.*2. Ecstasis. *Ecstasy.*3. Catalepsia. *Catalepsy.*4. Lethargus. *Lethargy.*5. Apoplexia. *Apoplexy.*6. Paralysis. *Palsy.*

CLASS V. GENETICA.

DISEASES OF THE SEXUAL FUNCTION.

ORD. I. CENOTICA.

AFFECTING THE FLUIDS.

GEN. I. PARAMENIA.

Mis menstruation.

Spec. 1. P. Obstructionis.

Obstructed Menstruation.

2. Difficilis.

Laborious Menstruation.

3. Superflua.

Excessive Menstruation.

4. Erroris.

Vicarious Menstruation.

5. Cessationis.

Irregular cessation of the Menses.

GEN. II. LEUCORRHŒA.

Whites.

Spec. 1. L. Communis.

*Common Whites.*2. Nabothi. *Labour-show.*

3. Senescentium.

Whites of advanced Life.

GEN. III. BLENORRHŒA.

Gonorrhœa.

Spec. 1. B. Simplex.

*Simple urethral Running.*2. Luodes. *Clap.*3. Chronica. *Gleet.*

GEN. IV. SPERMORRHŒA.

Seminal Flux.

Spec. 1. S. Entonica.

*Entonic Seminal Flux.*2. Atonica. *Atonic Seminal Flux.*

GEN. V. GALACTIA.

Mislactation.

Spec. 1. G. Præmatura.

*Premature Milk-flow.*2. Defectiva. *Deficient Milk-flow.*3. Depravata. *Depraved Milk-flow.*4. Erratica. *Erratic Milk-flow.*5. Virorum. *Milk-flow in Males.*

ORD. II. ORGASTICA.

AFFECTING THE ORGASM.

GEN. I. CHLOROSIS.

Green-Sickness.

Spec. 1. C. Entonica.

*Entonic Green-Sickness.*2. Atonica. *Atonic Green-Sickness.*

GEN. II. PRÆOTIA.

Genital Precocity.

Spec. 1. P. Masculina.

*Male Precocity.*2. Feminina. *Female Precocity.*

GEN. III. LAGNESIS.

*Lust.*Spec. 1. L. Salacitas. *Salacity.*2. Furor. *Lascivious Madness.*

GEN. IV. AGENESIA.

Male Sterility.

Spec. 1. A. Impotens.

Male Impotency.

2. Dyspermia.

Seminal Misemission.

Spec. 3. Incongrua.
Copulative Incongruity.

GEN. V. APHORIA.

Female Sterility. Barrenness.

Spec. 1. A. Impotens.
Barrenness of Impotency.

2. Paramenica.
Barrenness of Mis-menstruation.

3. Impercita.
Barrenness of Irresponsence.

4. Incongrua.
Barrenness of Incongruity.

GEN. VI. ÆDOPTOSIS.

Genital Prolapse.

Spec. 1. A. Uteri.
Falling down of the Womb.

2. Vaginæ.
Prolapse of the Vagina.

3. Vesicæ.
Prolapse of the Bladder.

4. Complicata.
Complicated Genital Prolapse.

5. Polyposa. *Genital Excrescence.*

ORD. III. CARPOTICA.

AFFECTING THE IMPREGNATION.

GEN. I. PARACYESIS.

Morbid Pregnancy.

Spec. 1. P. Irritativa. *Constitutional derangement of Pregnancy.*

2. Uterina.

Local derangement of Pregnancy.

3. Abortus. *Abortion.*

GEN. II. PARODYNIA.

Morbid Labour.

Spec. 1. P. Atonica. *Atonic Labour.*

2. Implastica. *Unpliant Labour.*

3. Sympathetica.
Complicated Labour.

4. Perversa.
Preternatural Presentation.

5. Amorphica.
Impracticable Labour.

6. Pluralis. *Multiplicate Labour.*

7. Secundaria. *Sequential Labour.*

GEN. III. ECCYESIS.

Extra-Uterine Fetation.

Spec. 1. E. Ovaria.

Ovarian Exfetation.

2. Tubalis. *Tubal Exfetation.*

3. Abdominalis.
Abdominal Exfetation.

GEN. IV. PSEUDOCYESIS.

Spurious Pregnancy.

Spec. 1. P. Molaris. *Mole.*

2. Inanis. *False Conception.*

CLASS VI. ECCRITICA.

DISEASES OF THE EXCERNENT FUNCTION.

ORD. I. MESOTICA.

AFFECTING THE PARENCHYMA.

GEN. I. POLYSARCIA.

Corpulency.

Spec. 1. P. Adiposa. *Obesity.*

GEN. II. EMPHYMA.

Tumour.

Spec. 1. E. Sarcoma.
Sarcomatous Tumour.

2. Encystis. *Encysted Tumour.*

3. Exostosis. *Bony Tumour.*

GEN. III. PAROSTIA.

Mis-Ossification.

Spec. 1. P. Fragilis.
Fragility of the Bones.

Spec. 2. Flexilis. *Flexility of the Bones.*

GEN. IV. CYRTOSIS.

Contortion of the Bones.

Spec. 1. C. Rhachia. *Rickets.*

2. Cretinismus. *Cretinism.*

GEN. V. OSTHEXIA.

Osthexy.

Spec. 1. O. Infarciens.

Parenchymatous Osthexy.

2. Implexa. *Vascular Osthexy.*

ORD. II. CATOTICA.

AFFECTING INTERNAL SURFACES.

GEN. I. HYDROPS.

Dropsy.

Spec. I. H. Cellularis.

Cellular Dropsy.

2. Capitis. *Dropsy of the Head.*
3. Spinæ. *Dropsy of the Spine.*
4. Thoracis. *Dropsy of the Chest.*
5. Abdominis. *Dropsy of the Belly.*
6. Ovarii. *Dropsy of the Ovaries.*
7. Tubalis.
Dropsy of the Fallopian Tubes.
8. Uteri. *Dropsy of the Womb.*
9. Scroti. *Dropsy of the Scrotum.*

GEN. II. EMPHYSEMA.

Inflation. Wind-Dropsy.

Spec. 1. E. Cellulare.

Cellular Inflation.

2. Abdominis. *Tympany.*

GEN. III. PARURIA.

Mis-Micturition.

Spec. 1. P. Inops.

Destitution of Urine.

2. Retentionis. *Stoppage of Urine.*
3. Stillatitia. *Strangury.*
4. Mellita.
Saccharine Urine. Diabetes.
5. Incontinens.
Incontinence of Urine.
6. Incocta. *Unassimilated Urine.*
7. Erratica. *Erratic Urine.*

GEN. IV. LITHIA.

*Urinary Calculus.*Spec. 1. L. Renalis. *Renal Calculus.*

2. Vesicalis. *Stone in the Bladder.*

ORD. III. ACROTICA.

AFFECTING THE EXTERNAL SURFACE.

GEN. I. EPIDROSIS.

*Morbid Sweat.*Spec. 1. E. Profusa. *Profuse Sweat.*

2. Cruenta. *Bloody Sweat.*
3. Partialis. *Partial Sweat.*
4. Discolor. *Coloured Sweat.*
5. Olens. *Scented Sweat.*
6. Arenosa. *Sandy Sweat.*

GEN. II. EXANTHESIS.

*Cutaneous Blush.*Spec. 1. E. Roscola. *Rose-Rash.*

GEN. III. EXORMIA.

*Papulous Skin.*Spec. 1. E. Strophulus. *Gum-Rash.*

2. Lichen. *Lichenous-Rash.*
3. Prurigo. *Pruriginous-Rash.*
4. Milium. *Millet-Rash.*

GEN. IV. LEPIDOSIS.

*Scale-Skin.*Spec. 1. L. Pityriasis. *Dandriff.*

2. Lepriasis. *Leprosy.*
3. Psoriasis. *Dry-Scall.*
4. Ichthyiasis. *Fish-Skin.*

GEN. V. ECPHLYSIS.

*Blains.*Spec. I. E. Pompholyx. *Water-blebe.*

2. Herpes.* *Tetter.*
3. Rhyppia. *Sordid Blain.*
4. Eczema. *Heat Eruption.*

GEN. VI. ECPYESIS.

Humid Scall.

Spec. 1. E. Impetigo.

Running Scall.

2. Porrigo.† *Scabby Scall.*
3. Ecthyma. *Papulous Scall.*
4. Scabies. *Itch.*

GEN. VII. MALIS.

*Cutaneous Vermination.*Spec. 1. M. Pediculi. *Lousiness.*

2. Pulicis. *Flea-bites.*
3. Acari. *Tick-bite.*
4. Filariæ. *Guinea Worm.*
5. Œstri. *Gad-fly Bite.*
6. Gordii. *Hair Worm.*

GEN. VIII. ECPHYMA.

*Cutaneous Excrescence.*Spec. 1. E. Caruncula. *Caruncle.*

2. Verruca. *Wart.*
3. Clavus. *Corn.*
4. Callus. *Callus.*

GEN. IX. TRICHOSIS.

*Morbid Hair.*Spec. 1. T. Senosa. *Bristly Hair.*

2. Plica. *Matted Hair.*
3. Hirsuties. *Extraneous Hair.*
4. Distrix. *Forky Hair.*
5. Poliosis. *Gray Hairs.*
6. Athrix. *Baldness.*
7. Area. *Arcted Hair.*
8. Decolor. *Miscoloured Hair.*
9. Sensitiva. *Sensitive Hair.*

GEN. X. EPICHRYSIS.

*Macular-Skin.*Spec. 1. E. Lencasmus. *Veal-Skin.*

2. Spilus. *Mole.*
3. Lenticula. *Freckles.*
4. Ephelis. *Sun-burn.*
5. Aurigo. *Orange-Skin.*
6. Pœcilia. *Pye-balled-Skin.*
7. Alphosis. *Albino-Skin.*

* ♀ Shingles. ♂ Ring-Worm.

† ♂ Scall-bitten.

CLASS I.

PHYSIOLOGICAL PROEM.

ACCORDING to the physiological arrangement proposed in this work, the first class of diseases consists of those which primarily affect or commence in the digestive organs, and impede the digestive function. I say *primarily* affect these organs, because they may be affected in a secondary manner, by sympathy or induction, in consequence of diseases which originate elsewhere, and on this account do not belong to the present class.

General character of the diseases of the class.

Now, in order to obtain a clear idea of the nature of the diseases before us, it is necessary to have a distinct knowledge of the organs which are the seat of them, and of the function which they embrace. To follow up this enquiry into a very minute detail, is the joint province of anatomy, physiology, and animal chemistry; and a finished practitioner must derive his information from these three sources collectively, pursued through an extent of many volumes. But, for our immediate purpose, it may be sufficient to give a general view of the subject.

Digestive organs.

No animal function displays a greater diversity of means for its performance than that of digestion; and, perhaps, the only point, in which animals of all classes agree upon this subject, is in the possession of an internal canal or cavity, of some kind or other, into which the food is introduced, and prepared for nutrition: an agreement, which may be regarded as one of the leading features by which the animal structure is distinguished from the vegetable. [Dr. Bostock, to whose chemical and physiological researches science is deeply indebted, has noticed that certain animals of the inferior orders are not furnished with any receptacle for food, but, like vegetables, imbibe their nutriment from the surface of the body.* The words of Blumenbach, however, to whom he refers as the authority on this point, do not justify the position that some animals have no stomachic cavity, but only that they have no mouth.† Thus, the infusory animalculæ are merely little living vesicles, absorbing their nutriment into their minute cavity, through their parietes, without any mouth. To these approximate the medusa-like animals (berenice, rhizostoma, &c.) which sometimes absorb their nutriment without a mouth, sometimes by numerous apertures. In the true medusæ, on the contrary, there is a single aperture for suction, on the inferior surface of the body, the cavity of which, in the *medusa aurita*, leads by four apertures into a like number of sacs, or stomachs, excavated in the gelatinous substance of

Digestive function.

* Elem. Syst. of Physiology, vol. ii. p. 436. † Compar. Anat. p. 129.

the body, which, in a manner almost inconceivable, are capable of digesting very hard bodies, *e. g.* small prickly fishes.*

Alimentary
cavity in
every ani-
mal.

Some form of an alimentary cavity is, perhaps, the best criterion of an animal hitherto suggested. Cuvier distinctly states that he knows of no animal unprovided with such an organ.† On the other hand, plants contain no large or separate internal cavity for the reception of their nourishment, which they absorb by pores on their surface, and especially by their roots and leaves. As the generality of animals possess the power of locomotion, they cannot have roots, by which they would be fixed in one situation. Most of them take their supply of food at once, according to need and opportunity, carry it about with them, and digest it at their leisure. This object is fulfilled by an alimentary cavity, of which the internal pores, for imbibing the nutriment, may be compared to vegetable roots, which take up food from the soil. Hence, Boërhaave used to say that animals have roots within them. A distinct alimentary cavity, generally having a reference to locomotion, is then, as Cuvier remarks, one of the most invariable characters of an animal. A single mouth, he says, which some naturalists have fixed upon as a criterion, and contrasted with the multiplicity of the pores of the roots of vegetables, is less constant; for, as we have noticed, some animals of the family of medusa have several mouths, yet only one common stomachic cavity.]

Let us next trace this cavity as it exists in man and some other animals, and observe the organs that are supposed to be auxiliary to it, and the powers by which it accomplishes its important trust.

In man.

The alimentary cavity in man extends from the mouth through the whole range of the intestinal canal; and hence its different parts are of very different diameters. In the mouth, where it commences, and in the pharynx, it is comparatively wide; it contracts in the œsophagus; then again widens to form the stomach, and afterwards contracts again into the tube of the intestines. This tube itself is also of various diameters, in different parts of its extent; and it is chiefly on this diversity of magnitude that anatomists have established its divisions. Its general length is five or six times that of the man himself; and, in children not less than ten or twelve times; [digestion in them being particularly active, from the greater necessity of growth and reparation. Meckel has found that the length of the small intestines is very irregular in different persons, varying from thirteen to twenty-seven feet, without any proportional difference in the stature of the body.‡ In some animals the intestinal canal is imperforate, the dross of the food being rejected by the mouth. It is so occasionally in birds and fishes; and this was once supposed to be the case in the medicinal leech: but Cuvier, Blumenbach, and Carus all agree, in opposition to Dumeril, that the leech has a very small open anus, from which, how-

In some
animals
imperforate.

* See Carus's *Comp. Anat.* vol. ii. p. 2. † *Dict. des Sciences Méd.* tom. ii. p. 145. ‡ *Manual d'Anatomie*, tom. iii. p. 390.

ever, only a little fecal matter is discharged, most of it being voided by the mouth. No anus has yet been satisfactorily detected in the tape-worm.* In the actiniæ, one aperture combines the two offices of mouth and anus.†]

In the human subject it is sometimes imperforate at birth, with a preternatural outlet to supply the place of an anus in some neighbouring part or organ, as the bladder, in which case the feces have been discharged by the urethra, the vagina, the navel, or the groin. An extraordinary instance of such accommodation is that of a girl who from birth was imperforate in the anus and meatus urinarius; in fact, in the whole division of the vulva; and who, to the age of fourteen, had regularly discharged her urine by the breasts, and her feces by a natural vomiting or rejection from the stomach.‡

Generally speaking, the extent of the digestive cavity bears a relation to the nature of the aliments by which the individual is designed to be nourished. The less analogous these aliments are to the substance of the animal they are to recruit, the longer they must remain in the body, to undergo the changes that are to assimilate them. Hence, the intestinal tube of herbivorous animals is for the most part (for we still meet with exceptions) very long; or, in particular portions, very capacious; in various kinds very complicated, and often double or triple. Thus, in the horse, the large intestines are of enormous size, and dilated into sacculi, while the cœcum is as capacious as the stomach. In the ruminant animals, besides the peculiar complexity of the stomach, the alimentary canal is twenty-seven times the length of the body. On the contrary, carnivorous animals have a short and straight canal; their food being already of their own nature, containing a larger quantity of nourishment in less bulk, and hence demanding a smaller proportion of time and space to become fit for use. [In them every circumstance concurs to accelerate the passage of the alimentary matter. It undergoes no mastication; it is retained for a very short time in the stomach; the intestine has no folds nor valves; its diameter is small; and the whole canal, when compared to the body, is extremely short, being only as three or five to one. Whales, however, have a longer canal than other carnivorous mammalia: their stomach is complicated, and the intestine has longitudinal folds. Indeed, carnivorous mammalia, of aquatic habits, are observed generally to possess a considerable length of intestine; a point, in which they differ from most other animals of that class. In omnivorous animals, the canal is not so long as it is in the herbivorous, nor so short as it is in the carnivorous. Thus, in the rat, its proportion to the body is as eight to one; in the pig, thirteen to one; and in man, six or seven to one. In him the diminution in length is compensated by the numerous valvulæ conniventes and the preparation of the food by cookery.§ The domestic cat, which eats bread as

Relative extent of the alimentary cavity.

* Carus's Comp. Anat. vol. ii. p. 15. † Ibid. p. 3. ‡ Samml. Med. Wahrnehm. b. viii. p. 29. § Blumenbach's Comp. Anat. p. 178.

well as flesh, has an alimentary canal considerably longer than that of the wild cat.]

Omnivorous
power of
human
stomach.

The digestive canal of man is less capacious and complex than that of most mammalia which take only vegetable food; yet larger and more complicated than that of other mammalia which live entirely on flesh. Hence, man seems to be capable of subsisting either on animal or vegetable food; and, from the nature of his digestive as well as of various other organs, is better qualified for every diversity of aliment and climate than any other animal. Thus, many nations in a savage state live almost, perhaps altogether, on fruits and roots; as those of the yam, beet, and potato, the bread-fruit-tree, bread-nut (*brosimum ali-castrum*), sweet-chestnut, banana, cabbage-tree palm (*areca ole-reacea*), and meal-bark (*cycas circinalis*). Others live on raw animal flesh, or flesh of the coarsest kind, as that of one species at least of the walrus (*trichecus dudong*), the sea-bear, and sea-calf. The Greenlander feeds voraciously on the skin and fins of the nord-capon, and on the flesh of whales. Many African tribes are said to live on dead lions and hippopotami. Dogs are eaten in the South Sea Islands, horses in Tartary, and cats in many parts as a substitute for rabbits. Among numerous tribes of savages, indeed, the flesh of man himself is still dressed for food: the custom may have been more extensive formerly than in the present day; but it still prevails in several of the Australasian isles, and is even exhibited in New Zealand, where the inhabitants are nevertheless peculiarly intelligent, and disposed to adopt the manners of Europeans. The Hindus subsist chiefly on rice and maize, and will not touch flesh of any kind. Many tribes of wandering or nomadic Moors on gums, principally gum seneca. The Kamschadales, and the wretched inhabitants of the neighbouring shores, on fishes, or coarse fish-oil mixed into a paste with saw-dust, or the rasped fibres of indigenous plants: while the more polished and luxurious nations of Europe live on solid and liquid foods of every description. Yet, it should not be forgotten that, in Ireland and some other places, the only aliment subsisted upon in extensive and populous communities, whose poverty prevents them from obtaining any other, is the potato.

Power of
animals to
derive nu-
triment
from food
not natural
to them.

Man, therefore, is omnivorous; but he is not the only omnivorous animal in the world: for the great Author of Nature is perpetually showing us that, though he operates by general principles, he is in every instance the lord, and not the slave, of his own laws. And hence, among quadrupeds, the swine, and, among insects, the ant (and more examples might be adduced if necessary), possess as omnivorous a power as man himself, and feed equally on the fleshy parts of animals, and on grain, and the sweet juices of plants. [In this respect, nature has in some degree a power of accommodation, where it would not *à priori* be expected. Thus, certain animals which, from the structure of their digestive organs, are plainly designed to live entirely either on vegetable or animal food, will subsist, as a matter of necessity, altogether on the particular kind not intended for them by Na-

ture, especially when the change is made in a gradual manner. Thus, in the northern parts of Asia, where grain is scarce, horses and oxen are sometimes fed on fish.* Spallanzani habituated an eagle to live on bread, and a pigeon on flesh.† If fresh water mollusca are put at once into sea water, or sea water mollusca into fresh water, they perish; but, if the change be gradually made, they live very well.‡]

It is sometimes suspected, that no animal can derive nutriment from any material that does not contain some portion of azote, which is an essential element of the animal body, and exists in it far more largely than in plants. [This doctrine, undoubtedly, cannot be correct, if spiders can live on sulphate of zinc,§ and the Otomacs eat little else some months in the year than large quantities of earth. A sudden change from a diet of fully azotized substances, like meat, bread, &c. to one composed of vegetables containing little or no azote, certainly cannot always be borne by the human constitution with impunity. This was proved in the eastern part of France, in the year 1817, where the failure of the crops produced such a famine that the poor were compelled to contend, as it were, with the beasts of the field for whatever vegetable productions could be found. The consequences were general anasarca, interruption of the menses, a diminution of the ordinary number of conceptions by one half, as carefully estimated by parochial documents, and permanent injury of the health. Even the sudden return to the use of barley bread, after the continuance of this miserable regimen for three months, was found not to be unattended with peril.||]

Whether azote be necessary to animal nutriment.

It has often been a question, whether the abundance of azote in animals is derived partly from the atmosphere, either by respiration or absorption, or by both these processes; or whether it is produced by the action of life itself; or is obtained from articles of food.

The experiments of M. Magendie rather tend to prove, that the great source of azote in the animal body is the food; for, on feeding animals of various kinds on substances that contain no sensible portion of azote, as sugar, gum, olive oil, and butter, together with distilled water, and confining them to this kind of diet, they gradually became atrophous and died. The secretions assumed the character of those of herbivorous animals: the food was digested, but the muscles were reduced to one-sixth of their proper volume. It is singular that all the animals before death exhibited an ulcer of the cornea, which sometimes spread through the membrane, and let out the humours of the eye. [It is conceived, by Dr. Bostock, however, that these experiments only prove, that the stomach is not capable of digesting the above specified substances in an unmixed form. Haller observes that certain animals are destroyed by the use of sugar,

Insufficiency of a diet consisting of only one article.

* See Home's Lect. on Comp. Anat. † Experiences sur la Digestion, c. 74 et 75. ‡ Ann. de Chimie, &c. vol. ii. p. 32, and Blumenbach's Physiology, 4th edit. p. 309. § Thomson's Annals of Philosophy, vol. xii. p. 494. || Gaspard, in Magendie's Journ. t. i. p. 237, &c.

although nutritious and salutary to others. In Stark's experiments, we have many examples of the indigestible nature of a diet composed of a single article, which was easily digested when mixed with other substances. In order to render M. Magendie's experiments unexceptionable, Dr. Bostock* thinks a diet should have been tried, composed of a mixture of substances destitute of nitrogen. In fact, M. Magendie himself admits, that the question is not yet settled, whether life can be long supported by the sole use of any one species of aliment, however nutritive.† At the same time, it deserves particular notice that, in 1750, a caravan of above one thousand Abyssinians, in consequence of having consumed all their provisions, are alleged to have subsisted for two months entirely on gum arabic, which happened to be amongst their merchandise.‡ If this be true, it proves, that man can live on a single substance that was found by Magendie to be insufficient nourishment even for dogs.]

Comparative length of the alimentary canal.

In general, the length of the alimentary canal is greater in mammalia than in the subordinate classes. It diminishes successively in birds, amphibia, and fishes; being in some fishes even shorter than the body itself, which is never the case in the first three classes; and in insects and worms is so diversified as almost to bid defiance to any kind of scientific arrangement; being, in many instances, short and narrow, as in the dragon-fly (*libellula*); and in others, as proper hydatids and infusory worms, constituting the globular membrane in which the entire structure of the animal consists. [On the whole, a long and complicated intestinal tube denotes that the insect feeds on vegetables; while the contrary character indicates animal food. So capricious has Nature been in the lower beings that, in the animals of corals and sponges, the intestines of several individuals frequently communicate (*e. g.* in the animals of the *pennatula*, sea-feather) where the nutriment of all is derived from a common source.§]

Buccal pouch.

Attached to the cheeks in some quadrupeds, as the monkey and marmot tribes, is a pouch or pocket, which conveniently holds their spare food, or enables them to convey it to their winter hoards.

Œsophagus, stomach, and intestines.

The mouth communicates with the stomach by the long, narrow membranous and muscular canal, denominated the œsophagus, or gullet. This in many animals is so dilatable as to enable them to swallow animals much larger than themselves.

[In those carnivorous animals which swallow voraciously, as the wolf, it is very large; but in many herbivorous ones of considerable size, and particularly such as ruminant, its muscular fibres are proportionably stronger, and capable of voluntary motion. The process of rumination implies a power of voluntary motion in the œsophagus; and indeed the influence of the will throughout the whole operation is incontestable. Rumination is not confined to any particular time; since the animal can

* Elem. Syst. of Physiology, vol. ii. p. 467. † See Physiology, transl. by Milligan, p. 222, 2d edit. ‡ Hasselquist, Voyages, &c. in the Levant, p. 293. § See Carus's Comp. Anat. vol. i. p. 14.

delay it, according to circumstances, when the paunch is quite full. In the occasional examples of the power of rumination in man, the operation is also found to be quite voluntary. The opening of the œsophagus into the stomach is marked by some differences, both with regard to its size and mode of termination; circumstances explaining why some animals, as the dog, vomit very easily; while others, as the horse, are scarcely susceptible of this operation,* which in the latter is also partly hindered from taking place through the mouth by the complete manner in which this cavity admits of being separated from the gullet by the velum palati.]

We have not time to follow up these playful diversities of Nature; and must confine ourselves to a brief glance at the general structure of the human stomach, to which the œsophagus conducts. This is situated on the left side of the diaphragm or midriff: in its figure it resembles the pouch of a bagpipe; its left end is most capacious; its upper side is concave, and its lower convex; the two orifices for receiving and discharging the food are situated in the upper part. In its substance it consists of three principal coats or layers, the external and internal of which are membranous, and the middle muscular. The internal coat, moreover, is lined with a villous or downy apparatus, and is extremely convoluted or wrinkled; the wrinkles increasing in size as the diameter of the stomach contracts. [Few parts are more largely supplied with blood-vessels than the stomach, and it not only partakes of the ganglionic nerves with the neighbouring viscera, but it likewise derives another supply of nerves from the spinal cord, and is distinguished from every other part, except the organs of sense, by having a pair of cerebral nerves almost entirely devoted to it, though it is situated at so great a distance from the brain.†] In an adult it will commonly contain three pints, or rather more; [and, according to Soemmerring, when it is moderately distended, it will hold from five to eleven pints. In opening some carnivorous animals directly after death, a middle muscular constriction is noticed, dividing the organ imperfectly into two compartments. Sir Everard Home deems a similar constriction natural to the human subject, and dwells much upon it in his theory of digestion: but, according to Soemmerring,‡ it is only occasionally met with in females, in whom he supposes it to be caused by the pressure of the central bone of their stays; an opinion hardly to be credited. M. Billman, of Cassel, has recently noticed the curious fact, that the stomach of the negro is rounder and shorter than that of the European; and a still more remarkable roundness exists in the stomachs of apes, as is represented in Daubenton's excellent plates.

Stomach.

With respect to the muscular fibres of the human stomach, the question is frequently agitated, whether they have any share or not in rejecting the contents of that viscus in the act of

* Blumenbach's *Comp. Anat.* p. 82—87, 2d edit. † See Bostock's *Elem. Syst. of Physiology*, vol. ii. p. 443. ‡ Soemmerring, in *Mem. of Bavar. Acad. of Sciences*.

Vomiting.

vomiting? In 1686, M. Chirac gave to a dog some corrosive sublimate on a piece of bread, which was almost immediately vomited up, though a violent retching afterwards continued. In this state of things, the animal's abdomen was opened, and the peristaltic action of the stomach appeared to be so feeble, that Chirac was led to infer that the expulsion of its contents could not be owing to it. Another statement is, that when the experimenter's finger was applied to the stomach while the retching was going on, no contraction of this organ could be felt. Duvorney also regarded the stomach as entirely passive in the act of vomiting. Mr. Hunter, if he did not go so far as the latter conclusion, certainly refers the chief part of the operation to the action of muscles.* This doctrine has received of late important corroboration from the experiments of M. Magendie. Two grains of tartarized antimony, dissolved in an ounce and a half of water, were introduced into a dog's crural vein. Nausea was quickly excited. The stomach was then made to protrude through a wound in the abdomen; when the spasm of retching was plainly seen to depend upon the action of the diaphragm and abdominal muscles; the stomach itself remained free from contraction, and its contents were not discharged. After the stomach had been returned into its natural situation again, so as to be capable of being acted upon by the above muscles, vomiting took place, and at the same time that viscus was felt with the finger to be relaxed. When the *nervi vagi* were divided, vomiting was not thereby prevented from being the consequence of the introduction of the tartarized antimony into the venous system; a fact confirming the result of some experiments made long ago by Dr. Haighton. Neither was vomiting hindered from being produced by this use of tartarized antimony, when the abdominal muscles were removed, provided the *linea alba* remained entire, between which and the diaphragm, the stomach was yet subjected to the necessary compression. When the phrenic nerves were cut, and the diaphragm was left with only a supply of nervous influence from a few filaments of the eleventh and twelfth dorsal nerves, it was so weakened, that it no longer duly antagonized the abdominal muscles, and vomiting could only take place in a feeble way. Perhaps, however, the most curious experiment was that, in which M. Magendie removed the stomach, substituted for it a bladder communicating with the *œsophagus*, and then threw the solution of tartarized antimony into a vein: even under these circumstances retching came on, and the contents of the bladder were vomited up.† Against these experiments, others are recorded by Maingault; and the subject can hardly be said to be yet determined. It appears however tolerably clear, that, even if the contraction of the stomach sometimes happens in ordinary vomiting, it is not essential; and that the action of the diaphragm and abdominal muscles are indispensable to the operation.]

* Animal Economy, p. 200, 2d edit.

† Mem. sur le Vomissement et Physiol. t. ii. p. 133.

In the more perfect classes of animals, the division between the large and small intestines is distinctly indicated by a muscular valve, formed jointly of the coats of the colon and the ileum by a short natural intussusception of the terminating portion of the latter into the commencing portion of the former; the important use of which is to moderate the flow of the contents of the smaller intestines into the latter, and to prohibit a regurgitation of feces into the former. And hence we never meet with fecal matter in the stomach, except in cases in which this valve or sphincter has lost the whole or a considerable portion of its muscular power. In the hedgehog, and several other quadrupeds, the valve of the colon does not exist; and in a few others, as the sloth and armadillo, the cæcum is wanting. In birds, the rectum, at the termination of its canal, forms an oval or elongated pouch, called *bursa Fabricii*, from the name of its discoverer; and then expands into a cavity, which has been named cloaca, from its receiving the extremities of the ureters and genital organs and their secretions; so that the fluids from all these are discharged from one common emunctory. The same mechanism is extended to a few quadrupeds, as the *ornithorhynchus paradoxus*, and the *hystrix*: the penis of the male, and the horns of the uterus in the female being equally lodged in its interior.*

Valve of the colon.

Cloaca.

Contributory to the function of digestion which is performed in the stomach and the parts of the alimentary canal immediately adjoining to it, are several organs which surround it, and are connected with it in a peculiar manner. Of these the chief are the pancreas, the liver, the spleen, and the omentum. The two last are less constantly found in the animal kingdom than the liver, to which they are by many physiologists supposed to be subservient. They generally become more obscure or diminish in size from quadrupeds to fishes: a remark that will equally apply to the pancreas, which upon the whole disappears sooner than the spleen. It is found in the shark and the skate: but, in other fishes, its place seems to be occupied and supplied by the cæcal appendices and pyloric cæca.

Collatitious organs of digestion.

The largest and most important of all these organs is the liver, by which the bile is prepared. It is the seat of a great variety of diseases, and appears to produce a very powerful effect on the blood itself, by the removal of several of its principles, independently of its office as a digestive organ. It descends, under some modification or other, from man to the class of worms; and, in the snail and several other gasteropodous mollusca is comparatively very large; but, in various kinds, is destitute of a gall-bladder, as well among quadrupeds as birds, fishes, and worms; though this appendage is common to all the amphibia, many of which, as the salamander, have livers of great magnitude.

Liver.

All these organs co-operate in digestion, though the peculiar effect produced by several of them is still a subject of enquiry. They present to our observation a variety of curious structures,

Enveloping membranes.

* Sir E. Home in Phil. Trans. 1802, pt. 1 and 2.

Bichat's
division of
proper
membranes.

Serous.

Mucous.

Fibrous.

Mastica-
tion.

Chyme.

Chyle.

Lacteal.

Saliva.

which we shall notice more at large in treating respectively of their deviations from health; and their surface is covered by a membranous plate, or sheet, supposed by Haller to be of condensed cellular membrane. Bichat has divided the proper membranes of the animal frame into three kinds; serous, mucous, and fibrous. The first forms a common external coating for the viscera, whether substantial or hollow; it is possessed of few nerves, and is lubricated by a perpetually ascending halitus. The second, or mucous membranes, form an internal coating to the larger tubes and hollow viscera, mostly connected with the skin at their extremities, as the mouth, nostrils, œsophagus and intestines, the cavities of the urinary and the uterine systems. They are enriched with numerous nerves, and their structure is loaded with minute glands, which secrete a muculent fluid, with which the interior surface of the organs is constantly moistened. The third, or fibrous division of membranes, belongs to another set of organs, and consists of the dura mater, which lines the skull, the membranous expansions of the muscles, the capsules of the joints, and the sheaths of the tendons.

The solid materials of the food are usually first masticated and moistened in the mouth and fauces, and in this state are introduced into the stomach, where they are converted into a homogeneous pulp or paste, which is called chyme: they are then in this pulaceous form introduced into the duodenum, and, by an additional operation, transmuted into a fluid, often presenting a milky appearance, and denominated chyle; in which state they are absorbed or drunk up by thousands and tens of thousands of little mouths of very minute vessels, which are sparingly if at all found in the stomach, but which line the whole of the interior coating of the small intestines into which the stomach empties itself. These vessels constitute a distinct part of the lymphatic system. From the frequently milky appearance of their contents, they are known by the name of lacteals; [but, as the chyle is not always white, perhaps a better name for them is chyliferous vessels]. They anastomose, or unite together gradually, and at length terminate in one or two common trunks, the chief of which is termed the thoracic duct. Their office is to convey the different streams thus collected from the alimentary canal, as well as from other parts of the body, to the sanguiferous system, to be still farther operated upon by the action of the heart and lungs.

[The saliva, or spittle, the fluid with which the food is first blended in the mouth, was lately examined by MM. Leuret and Lassaigne, who found it to contain one per cent. of solid matter, consisting of free soda, muriates of soda and potass, and carbonate and phosphate of lime, a trace of albumen, and much mucus. However, the most remarkable fact, recently detected respecting the saliva, is one for which animal chemistry is indebted to Professors Tiedemann and Gmelin, namely, the presence of the sulpho-cyanic acid in it, a poison of the greatest activity. All these physiologists, in their account of the uses of the saliva, represent it as lubricating the aliment preparatory to deglutition; as bringing sapid bodies under the influence of the organ of taste,

and as softening the food for digestion. Tiedemann and Gmelin further conceive, that its animal principles serve to assimilate unazotized aliments.

In the above sketch of digestion, the function of the lacteals or chyliferous vessels has been cursorily noticed. It must now be mentioned, that modern physiologists disagree very much about the extent of the office and power of these vessels. Thus, M. Magendie's experiments lead him to doubt, in opposition to the statements of Hunter, whether they ever absorb any thing but chyle; and it is one of his doctrines, that all other substances, and particularly drinks, are conveyed from the alimentary canal into the circulation by the veins. It is the villi of the intestines, he observes, formed in part by the origins of the veins, which absorb all the liquids in the small intestines, except the chyle. From the commencement of absorption until its conclusion, the properties of those liquids are discoverable in the blood of the branches of the vena portæ, but not in the lymph, or chyle, till long after absorption has begun. Magendie's experiments also tend to prove, that they then reach the thoracic duct, not through the chyliferous vessels, but by the communication of the arteries with the lymphatics. The vena portæ, which is the trunk of all the veins of the digestive organs, divides and subdivides in the tissue of the liver. Now, certain other experiments, of which M. Magendie gives the particulars, induce him to conclude, that this arrangement in the human economy has the effect of mixing the matter absorbed in the intestinal canal by the veins, intimately with the blood; and that, if large quantities of drink and other substances, not chyle, were to be at once transmitted to the source of the circulation by the thoracic duct, without having undergone a preliminary change in the liver, serious and fatal consequences would arise. The facts, on which this reasoning is founded, are highly interesting.

Whether lacteals absorb any thing but chyle.

Sir Everard Home formerly entertained a particular theory, that fluids passed from the stomach directly into the spleen. Though his observations disagree very much with those of Magendie, they corroborate one point maintained by the latter physiologist, namely, that fluids pass from the alimentary canal into the circulation by some other channel than that of the chyliferous vessels. Strong arguments against Sir Everard Home's theory are deducible from the fact that, if it were true, animals certainly could not exist and even enjoy good health without a spleen. Sometimes the spleen is wanting in man;* and sometimes it has been removed from animals, which recovered and lived very well.† The hypothesis also appears to be scarcely consistent with what happens in the horse, whose stomach, which is small in proportion to the size of the animal, could not contain the immense quantity of hay, grass, oats, and water, often consumed in a very short time; and it was mentioned by Mr. Green, in his lectures at the college in 1823, that Professor Coleman had ascertained by experiments, that the passage of the drink

* Lieutaud, tom. i. p. 234. † Th. Bartholini Anat. p. 155. Lugd. Bat. 1636. Mayo's Outlines of Physiology, p. 142.

into the intestines of a horse was frequently equal to the rate of ten feet in a minute. In this animal, therefore, the intestines must at least participate in the function, under ordinary circumstances.]

The means by which the food is broken down into pulp, after being received into the stomach, are various. In the first place, the muscular tunic of the stomach acts upon it by a slight contraction of its fibres; and, in connexion with a certain degree of pressure, derived from the surrounding organs, produces, so far as this cause operates, a mechanical resolution. Secondly, the high temperature in the stomach produces a concoctive resolution. And, thirdly, the stomach itself secretes and pours forth from the mouths of its minute arteries a very powerful solvent, which is by far the chief agent in the process, and thus effects a chemical resolution. In this manner, the moistened and masticated food is converted into chyme. It then passes into the duodenum, and becomes mixed with the secretions poured into this organ from the pancreas, the liver, and the duodenum itself, and subject to their action; and hence its conversion into chyle.

The whole process of digestion, therefore, as it occurs in the human body, to which the description now given chiefly applies, consists of three acts; mastication or chewing, chymification, and chyliification.

Many substances are so hard and intractable as to sustain the action of the digestive organs without any other change than that of being softened or otherwise partially affected, instead of being entirely subacted, and reduced to chyme or chyle. Such especially are the seeds of plants; and it is well worth observing, though it has not yet been noticed by physiologists, that, while birds or other animals derive from this kind of food a very valuable nutriment, notwithstanding its passing through them without being completely digested, the seeds themselves that are thus acted upon derive also a reciprocal benefit in many instances; and are hereby rendered more easily capable of expanding in the soil into which they are afterwards thrown as by accident, and have their productive power very greatly increased. The olive-tree has till of late years only been raised in the south of France by cuttings, or wild plants obtained from the woods. It was remarked by an attentive inhabitant of Marseilles that, when produced naturally, it is by means of kernels carried into the woods, and sown there by birds which had swallowed the olives. By the act of digestion, he further observed, these olives are deprived of their natural oil, and the kernels hence become permeable to the moisture of the earth; the dung of the bird at the same time serving for manure, and perhaps the soda which the dung contains, by combining with a portion of the oil that has escaped digestion, still further favouring germination. Following up this fact, a number of turkeys were made by the experimenter to swallow ripe olives; the dung was collected containing the swallowed kernels, the whole was placed in a stratum of earth, and frequently watered. The kernels thus treated vegetated easily, and a number of young plants were procured. And in

Chymifica-
tion.

Chyliifica-
tion.

Indigestible
substances.

Singular
mode of
rearing
olives.

order to produce upon olives an effect similar to that experienced from the digestive power of the stomach, a quantity of them were afterwards macerated in an alkaline lixivium; they were then sown, and proved highly productive.

Most of the plants found on coral islands, and in various other places, are propagated by the same means of passing through the digestive canal; and it is probable that the seeds of many of them are equally assisted by the same process. And even when they are completely disorganized and digested, the material to which their refuse is converted, and which, combined with the animal secretions that accompany it, is called dung, very powerfully contributes, as every one knows, to render the soil productive. So that, by the wisdom of Providence, animal digestion and vegetable fructification are equally dependant on each other, and are alternately causes and effects.

Vegetation promoted by animal dejections.

Considering the comparatively slender texture of the chief digesting organ, and the toughness and solidity of the substances it overcomes, it cannot appear surprising that mankind should, at different times, have run into a variety of mistaken theories in accounting for its mode of action. Empedocles and Hippocrates supposed the food to become softened by a kind of putrefaction. Galen, whose doctrine descended to recent times, and was zealously supported by Grew and Santarelli, ascribed the effect to concoction, produced, like the ripening and softening of fruits beneath a summer sun, by the high temperature of the stomach. Pringle and Macbride advocated the doctrine of fermentation; thus uniting the two causes of heat and putrefaction assigned by the Greek writers: while Borelli, Keil, and Pitcairn resolved the entire process into mechanical action, or trituration; thus making the muscular coating of the stomach an enormous millstone, which Dr. Pitcairn was extravagant enough to conceive ground down the food with a pressure equal to a weight of not less than a hundred and seventeen thousand pounds, assisted at the same time in its gigantic labour by an equal pressure derived from the surrounding muscles.

Early hypotheses concerning the digestive power.

Each of these hypotheses, however, being encumbered with insuperable objections, Boërhaave endeavoured to give them force by interunion, and hence united the mechanical theory of pressure with the chemical theory of concoction; while Haller contended for the process of maceration. Still a something else was wanting, and continued to be so, till Cheselden, in lucky hour, threw out the hint, for at first it was nothing more than a hint, of a menstruum secreted in some part of the digestive system; a hint which was soon eagerly laid hold of, and successfully followed up, by Haller, Reaumur, Spallanzani, and other celebrated physiologists. Although Cheselden was mistaken in the peculiar fluid to which he ascribed the solvent energy, namely, the saliva, still he led forward to the important fact; and the gastric juice was soon afterwards clearly detected, and its power incontrovertibly established.

Their utility.

Discovery of the gastric juice.

[The doctrine of digestion by trituration, or mechanical principles, was founded in a great measure upon an imperfect ac

Digestive
organs of
birds.

quaintance with the digestive organs of birds. Although birds are not furnished with teeth, many of them feed upon hard substances, which, if they were unbroken, the gastric juice could not dissolve. Hence they are furnished with a crop, which is a large membranous cavity at the lower end of the gullet, for the reception of the food when it is first swallowed, and where it is softened by the secreted fluids of the part. They are also provided with a gizzard, into which the food, after being macerated in the crop, is transmitted. The gizzard is a cavity of a moderate size, and flattish spherical form, composed of four strong muscles. Two of these, which constitute the greatest part of its bulk, are of an hemispherical shape, of a dense and firm texture, and lined with a thick callous membrane. The effect of their action is to move them laterally and obliquely upon each other, so that whatever is placed between them is subjected to a very powerful combination of friction and pressure. The force is such, indeed, as not only to break down the hardest grains, and reduce them to a complete pulp, but even to grind to powder pieces of glass, and to act upon siliceous pebbles and masses of metal, while the cuticular lining is so tough as not to be injured by the presence of lancets, or other sharp instruments, which have been introduced into the cavity by accident, or for the sake of experiment. As Dr. Bostock remarks, however, the action both of the crop and the gizzard must be considered as essentially mechanical, the latter being equivalent to the teeth, and the former serving merely for the purpose of maceration. A strict connexion is always remarked between the food of birds and the nature of their stomachs; those alone possessing the gizzard which swallow substances that the gastric juice could not dissolve in the entire state. Many writers, in describing the muscular stomachs of granivorous birds, speak of the gizzard as analogous to the digesting stomach of men, or of non ruminant quadrupeds, whereas it is only a substitute for the organs of mastication. Spallanzani proved, however, that the triturated substance in the gizzard is acted upon by the gastric juice, which is furnished by a glandular apparatus, the *bulbus glandulosus*, situated at the lower end of the gullet; the structure of the gizzard being evidently not adapted to its secretion. In birds, therefore, digestion is produced by a powerful solvent, just as it is in the human subject.]

Quantity of
the gastric
juice.

The gastric juice, this wonderful menstruum, the most active we are acquainted with in nature, is secreted, as I have already observed, by the capillary arteries that infinitesimally intersect the cellular texture of the stomach, and decussate each other in their ramifications. The quantity secreted during digestion is considerable: MM. Leuret and Lassaigue found, that when the gullet of a horse was tied, so as to prevent the secretions of the mouth and gullet from entering the stomach, a full meal of oats became completely saturated with gastric juice in four or five hours. Mr. Cruickshank supposes the quantity of the fluid thus secreted to be about a pound in every twenty-four hours. Yet the quantity seems to vary very considerably according to the

demand of the system, or the state of the stomach itself. In carnivorous birds, whose stomachs are called membranous from having little muscularity, and consequently, whose food is turned into chyme principally by the action of the gastric juice, without any collateral assistance or previous mastication, this fluid is secreted in a much larger abundance; as it is also in those who labour under that morbid state of the stomach which is called canine appetite, and will be distinguished in the present classification by the name of *limosis avens*; as likewise when, on recovery from a fever, or after long abstinence, the system is reduced to a state of great exhaustion, and a keen sense of hunger induces a desire to devour food voraciously and almost perpetually.

[Leuret and Lassaigne invariably found the gastric juice to be acid; and they state its component parts to be water, hydrochlorate of ammonia, chloride of sodium, mucus, an animal principle soluble in water, phosphate of lime, and lactic acid; and they impugn the accuracy of Dr. Prout's experiments, who concluded the free acid evolved during digestion to be the hydrochloric. On the other hand, Tiedemann and Gmelin observe that, if the contents of the stomach be examined after a long fast, and without any stimulus being applied to its villous membrane, the fluid found in it is a clear, ropy, rather opaque liquid, nearly or quite destitute of acidity. But if any stimulus, even of the simplest kind, be applied to the inside of the stomach, then the fluid secreted is uniformly acid. Pure gastric juice was best procured by making animals swallow quartz pebbles after a long fast, and killing them in an hour. It was generally grayish-white, ropy, and decidedly acid. When taken from the dog and the horse, it contained some mucus, osmazome, and salivary matter, alkaline sulphates, and hydrochlorates, the alkali being chiefly soda, besides phosphate and muriate of lime, with other salts in minute proportion; and the acidity was owing to the hydrochloric and acetic acids in the dog, and to these conjoined with the butyric acid in the horse. As the lactic acid of Leuret and Lassaigne is now acknowledged by Berzelius to be a variety of the acetic, all parties may be regarded as agreeing about the presence of that acid in the gastric juice. The researches of Prout, Children, and Graves, confirmed as they have been so amply by Tiedemann and Gmelin, also fully establish the presence of the hydrochloric acid. When the secretion of the gastric juice is elicited by its natural stimulus, food of various kinds, the chymous mass is invariably acid; and Tiedemann and Gmelin further maintain, as the result of their experiments, that its acidity is greatest when the food is most difficult of digestion. In dogs and cats, the greatest acidity was remarked when they were fed with coagulated albumen, fibrin, bones, or gristle; it was less when they took starch, gelatin, potatoes, or rice; and when they were fed with liquid albumen, the alkaline quality of the food was nearly sufficient to neutralize the acidity of the gastric juice.]

Qualities of
the gastric
juice.

This singular secretion has the peculiar property of coagula-

ting milk, as well as all albuminous substances, which it also as completely dissolves; and hence the milk thrown up from the stomach of an infant, shortly after sucking, is always found in a curdled state. [By infusing six or seven grains of the inner coat of the stomach in water, a liquor is produced, which, according to Dr. Fordyce, will coagulate 100 ounces of milk; or, according to Dr. Young, of Edinburgh, 6857 times its weight of milk.] But the two grand and characteristic properties of the gastric juice are its astonishing power of counteracting and correcting putrefaction, and of dissolving the toughest and most rigid substances in nature.

Antiseptic
power of
the gastric
juice.

Of its antiseptic power, abundant proofs may be adduced from every class of animals. Among mankind, and especially in civilized life, the food is usually eaten in a state of sweetness and freshness: but fashion and the luxurious desire of having it subacted and mellowed to our hands, tempt us to keep several kinds, as game and venison for example, as long as we can endure the smell. The wandering hordes of gipsies, however, and the inhabitants of various savage countries, and especially those about the mouth of the Orange River in Africa, carry this sort of luxury to a much higher pitch; for they seem to regard a fetor as a perfume, and value their food in proportion as it approaches putrefaction.

Now, all these foods, whatever be the degree of their putridity, are equally restored to a state of sweetness by the action of the gastric juice, a short time after they have been introduced into the stomach. Dr. Fordyce made a variety of experiments in reference to this subject upon the dog; and found, in every instance, that the most putrid meat it could be made to swallow was in a very short period deprived of its putrescency. We cannot, therefore, be surprised that crows, vultures, and hyenas, which find a pleasure in tainted flesh, should fatten upon so impure a diet; nor that the dunghill should have its courtiers, among insects, as well as the flower-garden.

The gastric juice has hence been employed as an antiseptic in a variety of cases out of the body. Spallanzani has ascertained that the gastric juice of the crow and the dog will preserve veal and mutton perfectly sweet, and without loss of weight, thirty-seven days in winter; whilst the same meats, immersed in water, emit a fetid smell as early as the seventh day, and by the thirtieth are resolved into a state of most offensive putridity.

Gastric
juice em-
ployed me-
dicinally.

Physicians and surgeons have, in like manner, availed themselves of this corrective quality; and occasionally employed the gastric juice of various animals, internally, in cases of indigestion from a debilitated stomach; and externally, as a check to gangrenes, and a stimulus to indolent ulcers.

Solvent
power of
the gastric
juice.

Yet the gastric juice is as remarkable for its solvent as for its antiputrescent property. Of this any industrious observer may satisfy himself by attending to the economy of digestion in many of our most common animals. But it has been strikingly exemplified in the experiments of Reaumur, Spallanzani, and Stevens.*

* For Dr. Stevens's experiments, which were numerous and well-conducted,

Pieces of the toughest meats, and of the hardest bones, enclosed in small perforated tin cases, to guard against all muscular action, were repeatedly, by the two former of these physiologists, thrust into the stomach of a buzzard. The meats were uniformly found diminished to three-fourths of their bulk in the space of twenty-four hours, and reduced to slender threads; and the bones were wholly digested either upon the first trial, or a few repetitions of it. The gastric juice of a dog dissolves ivory and the enamel of the teeth; that of a hen has been found to dissolve an onyx, and diminish a louis-d'or. And it is not many years ago that the handles of several clasp-knives were found half-digested, and the blades blunted, in the stomach and intestines of a man who had some time before swallowed these substances out of hardihood, and at last died in one of the hospitals of this metropolis. [The recent experiments of Leuret, Lassaigne, Tiedemann, and Gmelin, all confirm the statements of Spallanzani, Stevens, Gosse, and others, and contradict those of Montègre, who supposed that the gastric juice did not act out of the body. MM. Leuret and Lassaigne remarked, that the fluid procured by long sponges from the stomach of a duck while fasting, when kept upon bread crumbs, at a temperature of 88 degrees Fahrenheit, soon divided them into minute particles, and formed with them a homogeneous mass, precisely like chyme; and that, when flesh was mixed with the gastric juice of a dog, it was quickly softened, and deprived of weight. The observations of Tiedemann and Gmelin are more particular. The fluid found in the stomach of a dog, during the digestion of bones and coagulated albumen, was made the subject of experiment, and comparative observations were made with water and with milk. Various kinds of food were tried, such as bread, coagulated albumen, raw flesh, and boiled flesh; and in every instance it was observed, that the bread was broken down, in the course of eight or ten hours, into a pap, and the surface of the beef and albumen was converted into a pulp, which could be easily scraped off. Montègre is supposed to have failed in procuring similar results, because the fluid with which he operated was not gastric juice, secreted in consequence of the application of some stimulus to the stomach, but a mixture of saliva, the mucus of the gullet, and the kind of fluid found by Tiedemann and Gmelin in the stomach while empty and not stimulated. Yet MM. Leuret and Lassaigne, it is to be observed, succeeded with the gastric juice of a duck, though the animal was in the fasting state. A convincing proof of the power of the gastric juice to dissolve substances out of the body, as well as of its great antiseptic property, has lately been put upon record. A lad had a fistulous opening leading into the stomach, from which the gastric juice was readily procured, by means of a hollow bougie and elastic bottle. A piece of beef, connected with a thread, was introduced into the stomach, and another piece was

see his *Dissertatio Physiologica Inauguralis*; or an analysis of it in *Edin. Med. Comment.* vol. v. p. 116.

put into a phial of gastric juice, the temperature of which was 100°, the same as that within the stomach itself. The piece in the phial underwent a perfect dissolution, though more slowly than that in the stomach, probably in consequence of the latter being continually exposed to fresh gastric juice, and the peristaltic action of the stomach. Solutions of beef and chicken thus procured, remained a whole month in hot weather, free from fetor and sourness.* Tiedemann and Gmelin even attempted to accomplish, by means of the simple substances contained in the gastric juice, the same solution or digestion that is effected by this secretion itself; and they found that dilute acetic acid, dilute hydrochloric acid, a weak solution of acetate of ammonia, will severally dissolve most animal substances used as food. The experiments, however, are incomplete, because the effect of the foregoing articles united together as they are in the gastric juice, was not tried.]

Power of
the stomach
to digest
itself.

It is in consequence of this wonderful power that the stomach is sometimes found in the extraordinary action of digesting its own self; and of exhibiting, when examined in dissection, various erosions in different parts of it, and especially about the upper half into which the gastric juice is supposed to flow most freely. It was the opinion of Mr. Hunter,† however, that such a fact can never take place except in cases of sudden death, when the stomach is in full health, and the gastric secretion, now just poured forth, is surrounded by a dead organ. For he argues plausibly, that the moment the stomach begins to be diseased, it ceases to secrete this fluid, at least in a state of perfect activity; and that so long as it is itself alive, it is capable, by its living principle, of counteracting the effect of this solvent power. Yet it has been found thus eroded, in some cases, where death has followed long constitutional illness. But in such instances it has been suggested, that the stomach itself might have been free from the general disease; [a supposition much at variance with certain cases and dissections‡ mentioned by Dr. Armstrong.] Dr. Wilson Philip has occasionally found similar erosions in the stomachs of rabbits,§ and apparently from the cause suspected by Mr. Hunter.

Ability of
worms, &c.
to resist
digestion.

It is only perhaps upon the principle here laid down by Mr. Hunter, that when the stomach is in a state of disease it ceases to secrete a gastric juice of full vigour and activity, that we can account for the existence of exotic worms and the larvæ of insects and other animals for a considerable period of time without destruction. Thus Collini gives an example of a *lacerta aquatica* found alive in the stomach two days after it had been swallowed.|| Frogs and serpents have for a longer period of time been equally able to resist the action of the stomach; leeches swallowed unintentionally, in a draught of muddy water, have thriven and grown to an enormous size; the eggs and lar-

* American Medical Recorder, January, 1826. † Phil. Trans. 1772, vol. lxii. p. 447. ‡ Morbid Anat. of the Bowels, &c. p. 42, illustrated by plates, 4to. Lond. 1828. § Treatise on Indigestion, &c. p. 62. 8vo. Lond. 1824.

|| Journ. de Méd. tom. li. p. 460.

væ of various insects, and especially of the *musca cibaria*, and even of the spider, have been hatched or perfected in the stomach or intestines, and the kernels of plum and cherry stones have germinated there; all which we shall have occasion to notice more at length when treating of invagination and the diseases of the stomach.

Muscular action, however, to a certain extent, seems still requisite as an auxiliary in man, and even considerably more so in many animals, especially in graminivorous and granivorous birds.* I have already stated this as one cause of digestion; but M. Magendie has endeavoured to restore it to a much higher importance than fair and unequivocal experiments justify; for he asserts that, what he calls *artificial digestion*, or that of alimentary substances mixed with the gastric juice, and exposed to the temperature of the stomach, does not succeed in reducing the food to a state of chyme. But this, admitting the fact, would only show us the use of a living principle, and its influence upon every organ, and the operation or function of every organ; and which cannot be imitated out of the body. The assertion, however, is only advanced upon the single authority of M. Montègre, [the failure of whose experiments, as we have already noticed, is imputed by others to the fact, that the fluid with which he operated was not gastric juice, secreted in consequence of the application of some stimulus to the stomach, but a mixture of saliva with the mucus of the gullet, and the fluid found in the stomach while destitute of food, and not stimulated. In the artificial imitations of the process of digestion, the churning action of the stomach, however, ought certainly to have been taken into consideration, and a substitute for it adopted.

How far muscular action important.

The influence of the par vagum on digestion is an interesting subject, that has excited considerable attention. Mr. Brodie divided these nerves on the cardia, yet the food still continued to be transformed into chyme. M. Magendie took out a portion of a rib, and divided the par vagum on the œsophagus immediately above the diaphragm. Still the conversion of the food both into chyme and chyle was not interrupted. However, when the same nerves are divided in the neck, and particularly when a portion of them is removed, the formation of chyme is either very imperfect, or even quite prevented. The investigations of Dr. W. Philip, Breschet, and Edwards, prove, that galvanism applied to the stomach, after the division of the par vagum in the neck, restores the digestive process; and hence, the doctrine that digestion depends upon galvanic principles. The fact, however, may only prove, that galvanism is a sufficient stimulus to the vessels of the stomach to enable them to continue for a time the secretion of the gastric juice.

Influence of the par vagum.

Galvanism.

With respect to the power of the nervous system over digestion, a curious fact was demonstrated by the experiments of M.

* See Sir E. Home's articles, Phil. Trans. vol. xcvi. p. 357; xcvi. pp. 93. 139; c. p. 134; cxiii. p. 77.

Magendie; namely, that when the brain and a large portion of the cerebellum of a duck is removed, though the instinct of seeking food and even the power of deglutition may be lost, yet, if food be conveyed into the stomach, it will be digested.

It is frequently stated, that during chymification both orifices of the stomach are closed: but, according to M. Magendie, this point requires confirmation. His experiments teach him, that the return of food into the œsophagus is prevented by an alternate motion of this tube, the contraction of which becomes stronger, and the relaxation shorter, the more the stomach is distended. The contraction happens at the moment of inspiration, when the stomach receives the greatest degree of pressure. With respect to the pylorus, its resistance was found by M. Magendie to be different. In living animals, whether the stomach be empty or full, the pylorus is shut. Another constriction is frequently seen an inch or two from it, seemingly designed to hinder the food from reaching it. Irregular and peristaltic actions are also noticed, beginning in the duodenum, and extending to the pyloric portion of the stomach, the effect of which must be to press the food towards the œsophageal end of this organ.* On the other hand, Sir E. Home represents the stomach as divided into two compartments, during digestion, by a muscular constriction; the œsophageal one being for the reception of fluids, which he conceives pass thence directly to the spleen.

If, however, we are to believe other accounts, the cardiac portion of the stomach is the chief seat of digestion; and when a part of the food has there been acted upon in a certain degree, it is conveyed along the large curvature to the pyloric portion, where the process is completed. It seems also now to be established, that the digestive process does not go on equally through the whole mass of the food, but principally where this is in contact with the stomach; that it proceeds gradually from the surface to the centre of the mass, and that, as soon as a portion is reduced to a homogeneous consistence, it is transmitted into the duodenum, without the delay that would result from awaiting a similar change of the whole.†

The food having undergone a sufficient degree of maceration and mastication, or other mechanical process, by which it is reduced to a state of sufficiently minute division, it is acted upon by the gastric juice and the peristaltic contractions of the stomach, and the result is a complete change in its properties, its conversion into chyme; an alteration in every respect analogous to a chemical change. During the process of chymification, heat is occasionally extricated, and not unfrequently gas is evolved. Dr. Bostock, however, regards these not as necessary steps in the process, but rather as the consequence of a morbid state of the function. Previously to Dr. Prout's experiments, the generation of acid in the stomach used to be considered in

Whether
the orifices
of the sto-
mach are
closed?

Digestion
said to take
place
chiefly in
the cardiac
portion.

Chymifica-
tion.

* See *Physiol. transl.* by Milligan, 2d edit.

† Prout, in *Annals of Philos.* 1819.

the same point of view ; but these lead us now to believe it to be essential to the formation of chyme.*

Chyme is not always of the same quality, its properties depending very much upon the nature of the food. According to recent experiments, made on dogs and horses, it appears that liquid albumen forms under the natural process of digestion a homogeneous fluid, in which the albumen remains quite unaltered ; and this sort of chyme passes the pylorus more rapidly than any other. Coagulated albumen is much more slowly dissolved, and the fluid produced possesses the properties of coagulated albumen dissolved in acetic acid. Fibrin and vegetable gluten undergo a similar change. Gelatin is converted into a clear brownish fluid, in which neither gelatin nor albumen can be discovered. White cheese forms an opaque dirty white fluid, containing much animal matter, which, however, is neither the case with gelatin nor albumen. Starch is gradually dissolved, and loses its reaction with iodine, being converted into sugar and amidine. The results obtained with compound articles of food, such as milk, beef, bread, and oats, in various states of mixture, were such as the foregoing facts would lead one to anticipate. Bones gave a liquid that contained not only animal matter, but likewise a large quantity of lime. The general result is, that all the animal principles, except liquid albumen, undergo a material change during chymification, which change generally consists in their being made to approach nearer in their nature to albumen.†]

So far, therefore, as the organ of the stomach is concerned in the digestive function, we have some insight into the process. But beyond this, that is to say, of the nature of chylification, we have little or no knowledge that can be depended upon.

The aliment having been reduced to chyme in the stomach, is propelled into the duodenum, where it is converted partly into chyle, which is absorbed into the system from the small intestines, and partly into a residual matter, that assumes the nature of feces in the large intestines, and is ultimately rejected from the system. As it is into the duodenum that the biliary and pancreatic ducts discharge their respective fluids, chylification is generally presumed to be essentially connected with the action of the bile and pancreatic liquor.

[The constancy of the liver in almost all animals, its magnitude, and the destructive and grievous consequences arising from its diseases, are very convincing proofs of its high importance in the animal economy. With these facts before us, it may seem rather extraordinary that physiologists should not be in possession of some clear information respecting the functions of the liver, and the uses of the bile. In particular, the action of the latter secretion in chylification is yet very imperfectly understood. Its ordinary production from venous blood is a peculiarity that does not belong to any other secretion ; while the

Chyme.

Digestive process only partially known.

Chylification.

Function of the liver.

* Elem. Syst. of Physiol. vol. ii. p. 491.

† See the writings of MM. Leuret and Lassaigne, and of Tiedemann and Gmelin, or Edin. Med. and Surg. Journ. No. 93, p. 353.

great difference of its chemical qualities from those of every other fluid in the body is a point not less remarkable, and worthy of observation. According to the generally received opinion, the bile contributes in some way or another to the process of digestion. Fourcroy believed, that its saponaceous property made it capable of uniting the oily parts of the alimentary matter to water; that its bitterness was an indication of its being a stimulus to the intestines; and that it was decomposed by the acids usually produced in the digestive organs. At the same time, he thought that the bile served another purpose, besides that of promoting digestion. He conceived that the blood, in its circulation through the veins of the liver, acquired a fatty quality, and that the bile was a kind of reservoir of hydrogen, which, if too copiously diffused in the system, might produce a disturbance of the vital functions. The liver seemed to him to be intimately connected in function with the lungs; for, in the foetus that has not breathed, its size is very considerable, and whatever might be the operation of the bile in digestion, he concluded that the liver deprived the blood circulating through it of some redundant parts. In short, he believed that the liver performed an excrementitious operation in the abdomen, whilst the lungs were doing a similar office in the chest. The likelihood of this hypothesis was thought to be increased by two considerations: 1st, that of the large size of the liver in animals of limited respiration; 2dly, that of its being by far the most voluminous gland in man and quadrupeds.

Use of the
bile.

One obvious mode of forming a judgment of the uses of the bile, is to remark what ill effects result from the stoppage of its flow into the intestinal canal. On this point, however, the most discordant statements prevail. If we are to give credit to the account of Dr. G. Fordyce, when the ductus communis choledochus is tied, or blocked up by a calculus, the formation of chyle is not prevented, and consequently the biliary secretion is not essentially necessary for digestion. The same conclusion, with respect to its having no share in the formation of the chyle, is also adopted by some distinguished physiologists of the present time, as will be presently explained. On the other hand, Mr. Brodie, after tying the common biliary duct in young cats, was led to espouse an opinion long ago prevalent, that the principal use of the bile was to separate the chyle from the chyme; for he found, that when that duct was tied, and food given, chymification went on in the stomach as usual, but that no chyle could be detected in the intestines, or the lacteals, which only contained a transparent fluid, imagined to be lymph, and the watery part of the chyme. (See *Journal of Science and the Arts*, vol. xiv. p. 343.) Mr. Mayo's experiments also corroborated this view of the subject.

MM. Leuret and Lassaigne tied the common duct in a dog, and cleared out the intestines by giving the animal a little castor oil. Twelve hours after the operation, they thrice gave it bread and milk with sugar, at intervals of six hours; and eight hours after the last meal it was strangled, and immediately

opened. The stomach contained an acid pulp, and a very soft whitish sweet chyme adhered to the villous coat of the duodenum, and increased in consistence downwards. In the great intestines, it was firm, but had the same colour, and was nearly destitute of taste and smell. The thoracic duct was distended with a yellowish red transparent fluid, which coagulated on exposure to the air, and yielded the usual proportion of fibrin, albumen, and saline matters.

The experiments of Tiedemann and Gmelin are much more elaborate and precise. They remarked, that animals were attacked with vomiting soon after the operation; then with thirst and aversion to food; on the second or third day, the conjunctiva of the eyes became yellow, the stools chalky and very fetid, and the urine yellow, and convertible to blue, and then red, by nitric acid. Some of the animals died, others were killed. Of the latter, some had previously recovered from the jaundice, owing to the re-establishment of the duct by the effusion of lymph around the tied part, and the subsequent discharge of the ligature; a fact, also noticed by Mr. Brodie in his experiments. In the cases in which the biliary duct continued impervious, the colouring matter of the bile was found in the blood, the serous membranes, the cellular tissue, the coats of the arteries and veins, and in the fat. They further observed that chymification went on as perfectly as in a sound animal. In the small intestines they found nearly the same principles as in the healthy state, with the exception of those derived from the bile; and, in particular, they found in the duodenum, and in contact with its membrane, the soft mucous flakes which some physiologists consider, though, as Gmelin and Tiedemann think, erroneously, to be chyle. With the exception of the absence of certain biliary principles, the contents of the great intestines were likewise similar to those met with in the bowels of healthy animals; but they had an exceedingly fetid smell. In such animals as were fed a little while before death, the thoracic duct and the lacteals always contained an abundant fluid, which was generally of a yellowish colour. It coagulated, like ordinary chyle; the crassamentum acquired the usual red colour; its difference from the chyle of a sound animal was, that, after tying the ductus choledochus, it was never white. The reason of the difference is ascribed to the circumstance of the white colour depending upon fatty matter taken up from the food by means of the bile, which possesses the power of dissolving fat, and probably, therefore, aids in effecting its solution in the chyle at the mouths of the lacteals. It is supposed that Mr. Brodie was deceived by the absence of the white colour, which, it is true, the chyle usually possesses, but which, as is well known, it does not exhibit unless the food contain fatty matter. The only use of the bile in chylification, is restricted by Tiedemann and Gmelin to that of accomplishing the solution of fatty substances.

The following are the uses ascribed to the bile by these two celebrated physiologists: First, By its stimulant properties it excites the flow of the intestinal fluids, as is proved by the unusual dryness of the feces in jaundiced persons, and in animals whose

common duct has been tied. Secondly, It probably stimulates the intestinal muscular fibres to action. Thirdly, As it contains an abundance of azotized principles, it may contribute to animalize those articles of food which have no azote in their composition. Fourthly, It tends to prevent the putrefaction of the food during its course through the intestines; because, when it is prevented from flowing into them, their contents are much further advanced in decay than in the healthy state. Fifthly, It probably tends to liquefy and render soluble the fatty part of the food. Lastly, It is to be regarded as an important excretion.

According to the researches of the same physiologists, many of the principles of the bile, such as its resin, colouring matter, fatty matter, mucus, and salts, are thrown out of the body with the feces, in the natural state of the biliary system, or by the urine, or into the cellular tissue, when the excretory duct of the liver is obstructed. These principles contain a large proportion of carbon, and would appear, therefore, to be intended to carry off the excess of that element which is introduced into the system with vegetable food, and not thrown off by the lungs. In the lungs, it is thrown off in the state of oxidation; in the liver chiefly in union with hydrogen, and in the form of resin and fatty matter. That the liver is thus intended to assist the lungs in decarbonizing the blood seems to Gmelin and Tiedemann confirmed by the following facts. The resin of the bile abounds most in herbivorous animals, whose food contains a large proportion of carbon and hydrogen. In various tribes of animals, the pulmonary and biliary organs are in a state of antagonism to one another; a fact particularly insisted upon by Fourcroy. The size of the liver and the quantity of the bile are not proportionate to the quantity of the food and frequency of eating; but inversely to the size and perfection of the lungs. Thus, in those warm-blooded animals, which have capacious lungs, and live always in air, the liver, compared with the body, is proportionately less than in such as live partly in water. The liver is proportionately larger in reptiles, which have lungs with large cells incapable of rapidly decarbonizing the blood; also in fishes, which decarbonize the blood but slowly by the gills; and, above all, in molluscous animals, which effect the same change very slowly, either by gills, or small, imperfectly developed lungs. Another thing pointed out as highly deserving notice, is the increased quantity of blood transmitted through the liver, when the pulmonary system becomes less perfect. In mammalia and birds, the vena portæ is formed by the veins of the stomach, intestines, spleen, and pancreas; in the tortoise, it receives also the veins of the hind legs, pelvis, tail, and vena azygos. In serpents, it receives the right renal, and all the intercostal veins; in fishes, the renal veins, and those of the tail and genital organs.

Another observation, made by the same professors, is, that during the hibernation of certain animals of the class of mammalia, when respiration is suspended, and no food is taken, the secretion of bile goes on. An additional argument, in favour of the preceding hypothesis, is deduced from the physiology of the fœtus, in which the liver is proportionately a great deal larger than

Liver and
lungs func-
tionally
connected.

in the adult, and in which the bile is secreted abundantly, as appears from the great increase of the meconium during the latter months of pregnancy. Finally, another argument is derived from pathological facts. According to Tiedemann and Gmelin, in pneumonia and phthisis the secretion of the bile is increased; in diseases of the heart the liver is enlarged; and in the morbus cæruleus the liver retains its foetal state of disproportion. In hot climates, where, in the opinion of these physiologists, respiration is less perfectly carried on than in cold ones, owing to the greater rarefaction of the air, a vicarious decarbonization of the blood is established by an increased flow of the bile.

The foregoing hypothesis is, perhaps, better supported than that of Sir Everard Home, who considers one of the offices of the bile to be that of converting mucus, or the refuse matter of the chyle, as it passes along the colon, into fat, which is absorbed into the system. This indefatigable physiologist was partly induced to adopt this opinion by the example which he met with of a child, in which the peristaltic action of the bowels had been duly continued, and stools regularly produced, without any intermixture of bile, and even when no gall-bladder, nor any duct leading from the liver into the duodenum, existed.* The mere circumstance of this child being in a state of marasmus at its death, without any manifest intestinal disease, however, scarcely warrants the theory attempted to be built upon it, and which may be regarded as the reverse of what is inculcated by Fourcroy and Professors Gmelin and Tiedemann, who represent the bile as depriving the system of its redundant carbon and hydrogen, and not as a means of supplying a larger quantity of these elements to it. Moreover, on what chemical principles, and by what experiment, is it possible to prove, that fat can be formed by mixing bile with mucus, or the refuse matter of the chyle?

Whether fat
be formed
from bile?

Besides the secretion of the duodenum itself, which is supposed to be concerned in chylication, the pancreatic juice is another fluid apparently intended for the same purpose. The common opinion has been, that, in its nature, it is very similar to saliva. Tiedemann and Gmelin, however, who have recently examined it with great attention, represent it as differing materially from saliva, and never containing any sulpho-cyanic acid, free soda, or mucus; as being naturally acid; containing a much larger quantity of solid matter, and especially a much larger proportion of albumen; and, in the dog at least, a peculiar principle, soluble in water and in alcohol, and, when pure, precipitated rose-red by chlorine; and sometimes containing a good deal of phosphate of soda, and acetate of soda. The pancreatic fluid of the dog, horse, and sheep yields a large quantity of coagulum when heated, which the saliva does not. Magendie states that the particular use of the pancreatic secretion in digestion is unknown; and the subject has received no elucidation from MM. Leuret and Lassaigne. Professors Tiedemann and Gmelin, reasoning from the large quantity of azotized principles which it

Pancreatic
juice.

* Phil. Trans. 1813, art. 21.

contains, presume that its use may be to animalize the unazotized principles of vegetable food. They remark, as a confirmation of this opinion, that the pancreas is much larger in herbivorous than carnivorous animals *

Spleen.
Omentum.
Their offices not known.

Spleen not found below the class of fishes.

Of the action of the omentum and spleen we know nothing certain. The first may possibly serve the purpose of lubricating the viscera to which it is attached. The spleen secretes no peculiar fluid; its blood is of a dark livid colour, and coagulates with difficulty. It is even destitute of an excreting duct; and, in some instances, has been extirpated without injury to the general health. It is not found in any tribes below the class of fishes. [To some of the hypotheses concerning the use of the spleen, reference has already been made. The subject has been again recently examined by MM. Leuret and Lassaigne, whose experiments lead them to adopt the revived hypothesis that the spleen is a mere diverticulum for the blood during digestion. When the stomach and intestines are distended with food, and the process of digestion is going on, the blood flows in an increased quantity to the villous membrane of the whole alimentary canal, and consequently more venous blood requires to be returned by the hepatic vessels. These, however, being presumed to be inadequate to the purpose, the splenic veins and cells become gorged. Leuret and Lassaigne have found that the spleen of the dog, which generally weighs but a few ounces, acquired the weight of a pound and a half two hours and a half after a ligature had been applied to the vena portæ. In the dog, cat, rabbit, guinea-pig, and other mammalia, they found that the spleen had a rosy or vermillion tint while the animals were fasting; that after chymification has begun, it assumes a blue colour, and is somewhat tinged; but that it does not acquire its deep bluish black colour and greatest turgescence till the chyme has passed the pylorus, when the intestinal membrane participates in the activity previously confined to the stomach. This hypothesis is liable to the objection, that, if true, the absence or removal of the spleen from animals or the human subject ought certainly always to occasion more serious consequences than it is said to do.

Tiedemann and Gmelin represent the structure of the spleen as essentially resembling that of the lymphatic glands, and regard it as an organ which is merely an appendage to the absorbent system. They believe that its specific function is to secrete from the blood a reddish fluid that has the property of coagulating, is carried to the thoracic duct, and, being there united with the chyle, changes it into blood. The facts elucidated by the experiments of these physiologists are of great value: but it must be confessed that their hypothesis, relative to the spleen being an essential organ of sanguification, is seriously shaken by the facts that a vast difference really exists between the structure of the spleen and that of an absorbent gland; that the chyle does not invariably exhibit a reddish hue; and that the absence or removal of the spleen may hap-

* See Edin. Med. and Surg. Journ. Nos. 91 and 93.

pen, not only without fatal effects, but even without much subsequent disturbance of the animal economy.

Notwithstanding the progress of animal chemistry, and the multiplication of experiments on living animals, we are obliged to confess that our knowledge of the rationale of chylication is still involved in considerable perplexity and obscurity. But though we know not the exact way in which this process is effected, our acquaintance with the properties of the chyle itself is more satisfactory. However, it is only very recently that any accurate information concerning the chyle has been obtained, and we are much indebted to Dupuytren, Vauquelin, Emmert, Marcet, Prout, and Tiedemann and Gmelin,* for this very desirable advancement. If the animal, from which the chyle is extracted, has eaten animal or vegetable substances of a fatty nature, the liquid drawn from the thoracic duct is of a milky appearance, a little heavier than distilled water, of a strong spermatic odour, of a salt taste, slightly viscid, and plainly alkaline. It soon separates into three parts: a solid one, that remains at the bottom; a liquid one, at the top; and a third, which forms a very thin layer on the surface. At the same time the chyle assumes a bright rose colour. When, however, it is derived from food that is void of fat, it is opaline, and nearly transparent, instead of being of an opaque white colour, and the layer on the surface is less evident. Chyle never takes the hue of colouring substances in the food. M. Hallé has proved this by direct experiments. M. Magendie has also made animals eat indigo, saffron, and madder, without the colour of these articles being communicated to the chyle. This fact, which is confirmed by the experiments of Tiedemann and Gmelin in Germany, Andrews at Edinburgh, and Lawrence and Coates in America, is very important, because it is at variance with Mr. Hunter's statement, and upon its correctness the truth of the theory, which restricts the function of the lacteals entirely to the absorption of chyle, and of no other matter, very mainly depends. Chyle derived from sugar contains hardly any fibrin, while that from flesh has a great deal of it. The appearances and quality of this fluid are, therefore, considerably modified by the kind of food; and it deserves particular recollection that, as it is not always white, its pink or transparent look is not to be regarded as a proof, either of the lacteals having imbibed madder, or of the imperfect formation of the chyle.]

Chyle.

M. Magendie's experiments induce him to calculate that a dog, upon an average, forms about six ounces of chyle every hour.

Its quantity calculated.

The subject is highly interesting: but to pursue it further, and especially into that diversity of structure which the digestive organs present in almost all the different classes and orders, adapted, as it is in each of them, with the most skilful attention, to the general economy of their nature, and the mode of

* See *Recherches Expérimentales, &c. sur la Digestion dans les quatre Classes d'Animaux Vertébrés*. Paris, 1826.

life they are destined to lead, would occupy more space than we can spare, and carry us into the regions of general physiology. Enough has perhaps been said, and this is all that has been aimed at, to give a compendious view of the organs which form the seat of that class of idiopathic diseases, with which the nosological system about to be unfolded commences, and consequently to enable the reader to follow up those diseases with greater clearness and comprehension in their distinctive characters and descriptions.

Class limited to idiopathic diseases.

Stomach the seat of universal sympathy.

I have limited the above remark to *idiopathic* diseases; and it is necessary the limitation should be attended to. For, from the intimate connexion which the organs of digestion maintain with other organs, and sets of organs, there are few general complaints in which the first do not evince some *sympathetic* affection. This is particularly the case with the stomach, which, in the opinion of Mr. Hunter, is the seat and centre of universal sympathy: a doctrine which appears to have been taught in France by M. de Bourdeu,* though with less caution, and from fewer premises, at the very time Mr. Hunter was teaching it in London.

Such sympathetic affections cannot fall within the range of the present class; but must necessarily appertain to those diseases, and divisions of diseases, under which they rank as peculiar symptoms, and which can only be removed by removing the idiopathic malady.

CLASS I. CÆLIACA.

ORDER I.—*Enterica*.

DISEASES AFFECTING THE ALIMENTARY CANAL.

Disquiet or Diseased Action in some part of the Passage for the Reception and Detrition of Food.

CLASS I.
Division into two orders.

THE diseases of the DIGESTIVE FUNCTION form the first class in the Nosological System about to be unfolded; and to these, from the Greek term ΚΟΙΛΙΑ, "alvus," "venter," or "the lower belly," I have applied the classic name of CÆLIACA.

By an easy and natural arrangement, this class is divisible into two orders: the first embracing those disorders which affect the alimentary canal; and the second, those which affect the collatitious or auxiliary viscera. The former I have distinguished by the term ENTERICA, and the latter by the term SPLANCHNICA, both of which are Greek adjectives; the one being a derivation from εντερον, "intestinum," "alvus;" and the other from σπλαγχχον, "viscus," "a bowel, or entrail."

* See his Thesis, "An Omnes Corporis Partes Digestioni opitulantur?" Paris, 1754.

The present order embraces the following genera :

| | |
|-------------------|-------------------------|
| I. ODONTIA. | MISIDENTITION. |
| II. PTYALISMUS. | PTYALISM. |
| III. DYSFHAGIA. | DYSFHAGY. |
| IV. DIPSOISIS. | MORBID THIRST. |
| V. LIMOSIS. | MORBID APPETITE. |
| VI. COLICA. | COLIC. |
| VII. COPROSTASIS. | COSTIVENESS. |
| VIII. DIARRHŒA. | LOOSENESS. |
| IX. CHOLERA. | CHOLERA. |
| X. ENTEROLITHUS. | INTESTINAL CONCRETIONS. |
| XI. HELMINTHIA. | WORMS. |
| XII. PROCTICA. | PROCTICA. |

GENUS I. ODONTIA.—MISIDENTITION.

Pain, or Derangement of the Teeth or their Involucres.

THIS genus has by some writers been called odontalgia, and odaxismus. But, as both these terms have been limited by other writers to a single species of the genus, that of *odontia dolorosa*, or tooth-ache, in order to prevent confusion, I have ventured to give it the name under which it now appears; derived from *odous*, “a tooth,” which in fact, is the common root of all the terms, and is here preserved in its simplest form.

GEN. I.
Generic
name.

The involucres of the teeth are their gums, membranes, and sockets, or alveoli. The last, although an immediate apophysis of the jaw-bones, are rather to be regarded as an appurtenance of the teeth, than of the bones from which they issue. They are altogether limited to the duration of the teeth, sprouting forth at their commencement, and being carried away by absorption, on their decay or removal. They are also in every instance modelled by the shape of the teeth; and, like the gums, participate in almost all their diseases.

The character of the present genus is therefore made sufficiently general to embrace the disorders of these adjuncts of the teeth, as well as of the teeth themselves; all which, as distinct species, may be conveniently arranged in the following order:

Species.

| | |
|-------------------------|-------------------------|
| 1. ODONTIA DENTITIONIS. | TEETHING. |
| 2. ——— DOLOROSA. | TOOTH-ACHE. |
| 3. ——— STUPORIS. | TOOTH-EDGE. |
| 4. ——— DEFORMIS. | DEFORMITY OF THE TEETH. |
| 5. ——— EDENTULA. | TOOTHLESSNESS. |
| 6. ——— INCRUSTANS. | TARTAR OF THE TEETH. |
| 7. ——— EXCRESCENS. | EXCRESCENT GUMS. |

SPECIES I. Odontia Dentitionis.—*Teething.**Irritation from cutting the Teeth.*

GEN. I. DR. CULLEN did not allow dentition to enter into the list of
 SPEC. II. diseases: but, this is to suppose the process of teething to take
 Odontia. place at all times, instead of only occasionally, with perfect ease,
 Teething, and without irritation of any kind. Whenever it occurs in this
 how far a manner, there is undoubtedly no disease, and so far Dr. Cullen
 diseased ac- is correct. But, in a very large number of cases, perhaps, in
 tion. refined and intenerated society, in the larger number, there is
 not only disease, but, in many instances, disease of an alarming
 and fatal character; strikingly severe in its progress and com-
 plicated in its symptoms. The organism of the *teeth*, indeed, is
 peculiarly distinguished by the following feature: that there is
 no other part of the human structure so brief in its duration,
 and none, with the exception of the uterus, so signalized by
 pain and inconvenience during its progress. Yet, their mech-
 anism, notwithstanding these evils, is most admirable. No ef-
 fort of human wit has ever been able to improve upon it, even
 in imagination, and no organ is more strikingly impressed with
 marks of supernal goodness and intelligence. [The human
 teeth differ from those of animals in being all of one length, and
 having no considerable interspaces between them. Another of
 their peculiarities is the perpendicular direction of the lower
 incisors. In animals, these teeth slant backwards, and the
 jaw also slopes backwards directly from the alveoli, so that the
 full prominent chin is found only in man, while in animals it
 seems as if it were cut off. In man, the obtuse tubercles of the
 grinders are very particular, not resembling the flat crowns
 with rising ridges of intermixed enamel, belonging to herbivor-
 ous animals, nor the cutting and tearing grinders of the carni-
 vora.]

Peculiar-
 ities of the
 human
 teeth.

There are three periods of life, in which dentition, or the
 breeding and cutting of teeth, uniformly takes place: in in-
 fancy, in boyhood, and adult age. Besides which, we meet with
 instances occasionally of a reproduction of teeth in advanced
 life. Each of these formations is accompanied with circum-
 stances peculiar to itself; and, when attended with pain, or
 morbid action of any kind, affords a distinct modification of the
 present species of disease, and consequently lays a foundation
 for the four following varieties:

- | | |
|-----------------------|----------------------------------|
| α Lactentium. | Cutting the milk or shedding |
| Milk teething. | teeth. |
| β Puerilis. | Cutting the second set or per- |
| Permanent teething. | manent teeth. |
| γ Adulorum. | Cutting the adult or wise teeth. |
| Adult teething. | |
| δ Senilium. | Cutting teeth in advanced life |
| Climacteric teething. | or old age. |

Economy of dentition. Before we enter upon the symptoms of these varieties, it is
 necessary to give some explanation of the causes which pro-

duce them; or, in other words, to take a brief glance at the order and economy of dentition.

As the jaw-bones of youth are both wider and longer than those of infancy, it is obvious that the teeth which are cut in the first year must be incapable of filling up the bony arch of the fourteenth. They might, indeed, have been so contrived as to grow in proportion to the increased range of the jawbones; but, from their being extraneous bodies, this must have been a very complex process, while the very circumstance of their growth, and the internal change which must have continually taken place, would have exposed them to many more diseases than they are subject to at present.

A much simpler plan has been devised; and the teeth of man, as indeed of most mammalia, are composed of two distinct sets, differing both in number and structure: the first, or smaller set, consisting of ten for each jaw, which are cut between the [sixth and twenty-fourth month after birth; the most common period of their first appearance, however, being the commencement of the seventh,*] shed between the seventh and fourteenth year, and from the period of their protrusion called milk-teeth; and the second, or larger set, consisting of fourteen, fifteen, or sixteen for each jaw, for they occasionally vary in number, which are cut progressively, upon the shedding of the first set, between the seventh or eighth, and the seventeenth or eighteenth year; and which, from their continuing till old age, except in cases of accident or disease, are denominated permanent teeth. The farthest grinder on each side, however, is seldom cut so early as the eighteenth year, generally after the twentieth, and sometimes not till the thirtieth; on which account, these teeth are denominated *dentes sapientiæ*, or teeth of wisdom.

The rudiments of all the first set, and of four belonging to each jaw of the second set, are produced in the fœtus, and may be distinctly seen when it is about four months old: M. Serres declares that he has traced them, and even the teeth, at three.† [The jaw of a new-born child contains a number of cells, separated from each other by imperfect bony septa. By removing the external or internal plate of the jaw, the contents of these cells are exposed. They consist of membranous bags, named the *capsules* of the teeth, enclosing the rudiments of the bodies of these organs, and certain soft vascular substances, termed the *pulps*, on which the bodies of the teeth are forming. The bone of the body of the tooth is the part first formed; the enamel is added to this; and the fang appears the last in order. The pulp, which, according to Meckel, grows up from the bottom of the capsule, about the fourth month of fœtal existence, accurately resembles in shape the body of the tooth which is to be formed on it. It is a soft vascular substance, and its vessels are most numerous in that part which is covered by the portion of

GEN. I.
SPEC. II.

Odontia
Dentitionis.
Teething.
First set of
teeth.

Rudiments
produced in
the fœtus.

Process by
which they
are formed.

* Meckel, Manuel d'Anat. tom. iii. p. 351.

† Essai sur l'Anatomic et Physiologie des Dents, p. 3. 8vo. Paris, 1817.

GEN. I.
SPEC. I.
Odontia
Dentitionis.
Teething.

tooth already formed. The capsule is a whitish membrane, but very vascular on its inner surface. It includes the pulp, round the basis of which it adheres, and the rudiments of the imperfect tooth. On its outer surface it adheres firmly to the gum; so that, if we attempt to tear the last-mentioned part away from the jaw of a fœtus, the capsules and their contents will come away at the same time. These membranes adhere less closely to the bony cells in which they are contained. The office of the capsule is that of secreting the enamel: in its cavity is a small quantity of fluid. The ossification commences by the formation of the cutting edge of the incisors, and the grinding bases of the molares. The bony substance being deposited on the pulp, as on a mould, the rudiments of the teeth are necessarily hollow; and the bony layers first formed are those which will be in contact with the enamel when it is deposited. As the formation of the tooth advances, the pulp is gradually surrounded, till the whole is covered by bone, except its base.

The adhesion of the pulp to the newly-formed tooth or bone is very slight, and no vessels can be discerned going from one to the other: it is, however, most strongly attached round the thin elastic edge, which is the last part formed. When the bone has covered all the pulp, it begins to contract a little, and becomes somewhat rounded, making that part of the tooth which is called the *neck*, and from this place the *fangs* begin. The formation of the fangs makes the bodies of the teeth ascend through the sockets, and afterwards through the gum, which is absorbed in consequence of the pressure of the tooth.

The pulp has originally no process answering to the fang; but, as the cavity in the body of the tooth is filled up by the ossification, the pulp is lengthened, and the fang forms over it. The latter part grows in length till the whole body of the tooth is pushed through the gum, the socket at the same time contracts at its bottom, and grasps the neck or beginning fang, adheres to it, and rises with it. Thus the alveolus is raised with the fang, and the fang does not itself sink or descend into the jaw.

If two or more fangs are to be formed, the process is rather more complicated. When the body of a molaris is completed, there is but one general cavity in the tooth, from the brim of which the ossification is to shoot, so as to form two or three fangs: if two only, then the opposite parts of the margin of the cavity shoot across where the pulp adheres to the jaw, meet in the middle, and thereby divide the mouth of the cavity into two openings, from the edges of which the two fangs grow. It is a curious circumstance, however, that at the very time when the pulp is restricted to the crown of the tooth, the number of future fangs is already denoted by that of distinct branches given off by the dental vessels.* When the surface of the tooth first appears through the gum, its body is yet more hollow than that of a perfect tooth, and the fang is only in an incipient state. In proportion as the tooth rises through the gum, however, the

* Meckel, Manuel d'Anat. tom. iii. p. 343.

hollow is gradually filled up, and the fang is lengthened. When the bone of the body of the tooth is somewhat advanced in its formation, the enamel begins to be deposited on its surface from the vessels of the capsule. This deposition commences on the masticating surface of the tooth, and thence extends towards the root. The enamel is complete when the fang of the tooth begins to be produced, for at that time the body penetrates the gum, and thereby lays open the capsule, which at this period is found to have undergone great alteration in its texture and appearance. Instead of the soft vascular surface which it exhibited while the deposition of the enamel was going on, it is now dense, and almost tendinous, with very few blood-vessels. When the fang begins to grow, the capsule also becomes connected to it, and forms its periosteum.]

GEN. I.
SPEC. I.
Odontia
Dentitionis.
Teething.

From what has been said, it appears that the alveolus, or socket, shoots up from the jaw-bone as the tooth advances. It accompanies its growth, and at first entirely surrounds it; by which admirable contrivance a firm support is given to the gums from the time of birth, and the infant is enabled to make a sufficient pressure for the purpose of sucking, without interfering with the form which the teeth, yet soft and amorphous, are destined gradually to assume. In due time, however, the alveolus yields in its upper surface, as the tooth, in consequence of the gradual elongation of its fang or fangs, is forced through, and cuts not only the socket but the gum; and when the first set, having answered its temporary purpose, loses its fangs by absorption, and the body of each tooth is shed or cast out by the gums, the attendant sockets are equally absorbed, and disappear at the same time.

This wonderful change begins to take place, as I have already observed, about the seventh year, the artery of the milk teeth and its canal undergoing a more or less perfect obliteration;* at which time we possess far more teeth, including both the grown and the growing, than at any other period whatever: for we have in each jaw ten temporary teeth complete, ten incomplete to succeed them, and the two permanent grinders, whose stamina were formed during foetal life, making not less than forty-four in the whole. Other writers than Mr. Hunter place this change at an earlier period: Dr. Blake, indeed, as early as the fourth year;† and M. Lemaire, who follows Blake in most other points, follows him in this also.‡ The permanent teeth have separate sockets of their own; and, in consequence of the prolongation of the jaw-bones, do not lie immediately under the corresponding shedding teeth, nor directly contribute to the process of shedding, which chiefly takes place in consequence of the absorption of the fangs and sockets of the temporary set, though their ascent contributes in some degree to the general process.

Second set
of teeth.

Seems to
vary in
time of oc-
currence.

I have observed that the alveoli, or sockets, though fixed

* Serres, p. 19.

† Dissertat. Inaugur.

‡ Traité sur les Dents. 8vo. Paris, 1822.

GEN. I.
SPEC. I.
Odontia
Dentitionis.
Teething.

Changes in
advanced
life.

Different
position of
teeth in
different
animals.

Orders of
animals
possessing
teeth often
derived
from their
varying
forms.

upon the jaw-bones, and indeed issuing from them, are rather to be regarded as appendages of the teeth than of the bones from which they spring; that they participate in most of the diseases of the teeth, and are strictly coeval with them; sprouting forth on their origin, modelled by their shape, and disappearing on their decay or removal. It is this disappearance, which is the work of absorption, that principally produces that change in the character of the face which peculiarly distinguishes the period of old age. It follows closely upon the loss of all the teeth; and when these have uniformly given way, and their respective sockets are no longer in existence, as not being wanted, the upper jaw becomes considerably diminished in its range, the under jaw reduced to a thin bone merely covered by the gums, and the roof of the mouth, instead of being arched, is rendered almost flat. And from this loss of substance, which is nearly equal to an inch and a half in depth, the face becomes shortened, the cheeks wrinkled, and the chin projecting.

It is curious to observe how differently the teeth are situated in different animals. In the more perfect, they are placed in sockets in the jaw-bones, some of which are in many kinds rendered moveable, as the two fore teeth of the lower jaw of the *mus maritimus*, or African rat, the largest species of the genus hitherto discovered. The same teeth are equally moveable in the kangaroo; and the hollow tusks or poisoning fangs of the rattlesnake, and other venomous serpents, are capable of depression or elevation at the option of the animal. In the lamprey and myxine, the teeth, which are almost innumerable, are placed on the surface of the tongue; in the cancer genus, in the stomach; where we likewise find them in the common earwig. In the cuttle-fish, they are also placed in the middle or lower part of the body, two in number, and horny, and in their figure resemble the bill of a parrot. In the echinus, or sea-hedgehog, they are five in number, arranged around the opening of the under part of the shell, and being moveable by different muscles, they form a very complete organ of mastication. In the *aphrodita aculeata*, or sea-mouse, they are fixed upon the proboscis, four in number, and are consequently extended or retracted with this organ at pleasure. The leech has three pointed cartilaginous teeth, which it is able to employ in the same way, and by means of which it draws blood freely.*

The form of the teeth is so different, even in the different genera of animals that possess them in a true or perfect state, that this diversity has been laid hold of by many naturalists, as a distinguishing characteristic of their kinds or orders. Linnæus, confining himself to the fore-teeth, has hereby formed seven distinct orders for the class of mammalia; and M. de Blainville, carrying the basis of this distinction farther than to the form and structure of the fore-teeth, has made it a foundation for the subdivisions of these orders into genera.†

* See, for other peculiarities, Phil. Trans. vol. lxxxix. p. 237; xci. p. 319.

† Nouveau Dict. d'Hist. Naturelle, vol. ix. art. DENTS, Paris, 1817.

Whatever be the time in which teeth are generated and protruded, the process is often so gradual that little or no pain or other inconvenience is experienced; and consequently, under such circumstances, there is no disease. But I have already observed, that there is often not only pain and irritation, and therefore disease, but, in various instances, disease of a severe, complicated, and alarming character. And it is to *dentition* under these circumstances, that I am now about to direct the reader's attention.

GEN. I.
SPEC. I.
Odontia
Dentitionis.
Teething.

It will readily be supposed that the most violent symptoms of dentition are those produced under the first stage referred to in the preceding history, or during the growth and protrusion of the MILK OR SHEDDING TEETH; for the system is then in its tenderest state of infancy, and prone to disorder from very slight causes of irritation.

α O. Dentitionis Lactentium.
Milk-teething.

The immediate cause of irritation in the present instance is the pressure of the teeth in the gums; and the degree of irritation depends upon the peculiar temperament of the child. As the teeth push forward, the superincumbent gum wastes in consequence of absorption, and is at last cut through, and the tooth makes its appearance. This pressure is not, however, uniformly exerted through the whole course of teething, but is divided into distinct periods or stages; as though the vital or instinctive principle, which is what we mean by nature, becomes exhausted by a certain extent of action, and then requires rest and a state of intermission. The first active stage of teething is usually about the third or fourth month of infancy; and constitutes what is called breeding the teeth, or the production of their bone from the pulpy rudiment, buried in the gum, and formed during foetal life, which at the same time shoots downwards, and gives to every tooth a neck and fang. The first and most usual symptom of this change is the looseness with which the infant grasps the nipple, and the frequency with which it lets go its hold, accompanied with fretfulness and crying, and succeeded by a copious discharge of saliva, the salivary glands partaking of the irritation of the gums. Next, the uneasiness of the gums is found to be relieved by the pressure of any hard substance upon them which benumbs their excited sensibility; and hence the child is pleased with having its gums rubbed with the fingers, a coral, or a gold ring.

First stage;
or breeding
the teeth.

This last is perhaps the oldest method, and it may be the best: for the experiments of Dr. Chrestien, of Montpellier, who has of late endeavoured to revive the old preparations of gold as a part of the *materia medica*, show sufficiently that this metal, in very slight quantities of some of its simplest forms, is peculiarly active, and a powerful exciter of those secretions which have a tendency to diminish irritation and subdue inflammatory action. He has proved before a committee of the Royal Academy of Sciences, at Paris, that friction of the tongue and gums with not more than four grains of powder of gold produces sometimes a copious ptyalism, sometimes abundant alvine eva-

GEN. I.
SPEC. I.
α O. Denti-
tionis Lac-
tentium.
Milk-teeth-
ing.

cuations, and sometimes profuse perspiration.* M. Auzebi, however, dissuades from the use of friction by the finger or any other means, from an idea that the gum will hereby become more callous, and consequently more difficult to be cut through.† But, so far as I have observed, this idea is not supported by facts. In many respects M. Lallemand has since confirmed Dr. Chrestien's observations.‡

Symptoms
of irritation.

If the irritation become very considerable, the gums swell, the child grows still more fretful, and starts in its sleep; or, on awaking suddenly, there is heat, thirst, and other concomitants of pyrexia, with perhaps dullness or drowsiness; the bowels are affected, which is a usual symptom, and a rash appears on the skin, usually the *red-gum*, and if the irritation extend to the muscles of the chest, there is a dry and troublesome cough. It is the opinion of Dr. Withers, as given in his treatise on asthma, that a cough, during dentition, never takes place but from primary affection of the respiratory organs: yet I have often seen this effect produced as evidently from mere sympathy, as increased flow of saliva, or looseness of the bowels. In about ten days or a fortnight, these symptoms subside; and though the infant may occasionally be teased with slight paroxysms of uneasiness, it generally passes on without much inconvenience till the arrival of the second stage, or period of cutting the teeth, which we may expect to take place between the seventh and the close of the ninth month, though sometimes this does not occur till a few months later.

Second
stage: or
cutting the
teeth.

This is the usual progress; but here, as in many other organs of the system, we sometimes meet with a singular precocity of action, and at other times with as extraordinary a hebetude: and hence, while it is no uncommon thing for an infant to be born with several of its milk-teeth already cut; a fact which has in various instances occurred to myself, and is especially noticed by Helwig§ and other writers. Sometimes, however, the milk teeth are found to be extremely tardy in their appearance, and in one instance are said not to have been protruded before the child was ten years old.|| [According to Meckel, the appearance of teeth at birth is particularly frequent in such infants as have not been born till after the usual period.¶]

Milk-teeth
formed pre-
maturely.

It is an observation of Mr. Fox, that these premature teeth, which are usually the central incisors of the under jaw, are nothing more than the upper parts or crowns of teeth without the apparatus of fangs; that they have consequently a weak attachment to the gums, soon get loose, and produce a considerable inflammation in the mouth of the child, as well as great inconvenience to the mother:** and he recommends, accordingly, that they be immediately extracted. Speaking generally, this ac-

* Recherches et Obs. sur les Effets des Préparations d'Or. 8vo. Paris.

† Traité d'Odontalgie, où l'on présente un système nouveau sur l'origine et la formation des Dents, &c. Lyons. ‡ Journ. Générale des Sciences Médicales, Août, 1822. § Obs. 23. || Eph. Nat. Cur. Dec. II. Ann. IV. Obs. 28. ¶ Manuel d'Anat. tom. iii. p. 359. ** Hist. of the Teeth, p. 6.

count is correct; but as there are instances in which teeth of this premature growth are possessed of fangs and are perfect, it is better to wait before we extract them, till some inconvenience arises which may call for their removal.

It is somewhat singular, that the natural growth of the first set of teeth does not seem to be varied, at least, according to any general rule, by the degree of strength of the infant; for weakly children often cut their teeth even more rapidly than those in robust health, though the reverse is perhaps more generally the case; and hence the stimulus of irritation in the process of dentition very nearly keeps pace with that of healthy vigour.

At this time the gum is often extremely sensible, and instead of being eased by the pressure of a hard substance, cannot endure the slightest touch. At the base it is florid and distended, but paler and whiter at the edge or upper part, and when the tooth is on the point of protrusion, seems covered with a flat and whitish blister. The other symptoms are a repetition of those just described, with a scabby eruption about the lips or head, erythematic inflammation behind the ears, and occasionally spasmodic movements of the mouth and jaws, convulsions, or epilepsy.

The grand point is here to moderate the local irritation. A diarrhœa or full discharge of saliva does this naturally, and hence these are favourable symptoms. And if the former be too violent, or accompanied with griping, it should be merely corrected by magnesia or prepared chalk. If the bowels be confined, we must employ cooling laxatives; and the discharge of a small quantity of blood from the gums in the first stage, by lancing them, will often afford effectual relief. If the symptoms of oppression or spasmodic action be severe or incumbent, as drowsiness, difficulty of breathing, stertor, or irregular motion of the jaws, antimonial emetics and leeches should be had recourse to, and occasionally repeated; after which, blistering will be found useful behind the ears or on the back. And when the bowels have been thoroughly emptied, the use of anodynes may be allowed, and will generally prove highly serviceable; though they should be employed with great judgment, and never entrusted to nurses. Hyoscyamus, in most of its forms, has often succeeded here as well as in adult tooth-ache, when judiciously administered.

In the second stage, or when the teeth are on the point of protrusion, the lancet will often afford immediate relief, not by a discharge of blood, for the upper part of the gum is now become so thin and wasted that little or none will follow, but by giving a direct opening to the tooth, which will frequently make its appearance in the course of a few hours. In this stage, however, if we cannot at once cut down directly upon the tooth, the lancet had better be withheld, for we shall be certain of giving pain, though very uncertain of affording relief.

It is singular that the use of the lancet should be objected to so generally. The tooth is imprisoned by a membrane that sur-

GEN. I.
SPEC. I.

α O. Dentitionis Lactentium. Milk-teething.

Symptoms of irritation.

General treatment.

Lancet, when useful in the second stage.

GEN. I.
SPEC. I.
α O. Dentitionis Lactentium.
Milk-teething.

rounds it on a full stretch, and that is in a state of inflammation. Lancing the gum, or rather the inflamed membrane below the gum, takes off the tension, and sets the tooth free. The pain is slight and transient, and by no means to be compared with the permanent uneasiness which the operation undertakes to relieve. It has been conceived, that a tough indurated cicatrix will be formed if the divided edges of the gum should unite after the lancet has been applied. Yet in the spongy texture of this organ no such effect is found to follow; but, on the contrary, the recently united edges of the gum, as in all other parts, far more easily give way to the process of absorption than they would otherwise have done; by which means the passage of the tooth is facilitated.

Rubefaciens.

As the erythematic inflammation, which occasionally takes place behind the ears, proves often useful as a revellent, it has also been found sometimes serviceable to imitate it by a friction with savin ointment, or other rubefaciens. But I cannot advise that this or any other eruptions, when produced naturally, should be suffered to run their course without restraint: for I have often known them become a worse evil than the original disorder. In this case, they should unquestionably be exchanged for some other more convenient discharge.

β O. Dentitionis Puerilis.
Permanent-teething.

In cutting the SECOND OR PERMANENT SET OF TEETH, it is not often that much uneasiness is encountered: for firstly, their progress is much slower than that of the shedding-teeth; and, next, the constitution, with the acquisition of a greater degree of strength, is at this time become much less irritable. In a few cases, however, they push forward too rapidly, and urge the shedding-teeth against the superincumbent gums so forcibly as to excite considerable pain; and here a free application of the lancet affords the speediest and most efficacious relief. And not unfrequently the permanent teeth ascend with great irregularity, and press against the crown or fangs of those above them in erroneous directions; whence another source of considerable pain. In this case, the best and indeed the only radical cure is to extract the upper or cutting tooth, and thus allow freedom to the under tooth to right itself.*

[The milk-teeth occasionally continue in the jaw long after the common period of their being shed; and, as this circumstance does not necessarily prevent the permanent ones from being cut, the jaw seems at first really to contain a preternatural number of teeth; but, in most instances of this kind, the appearance of the permanent teeth is retarded, or they are even wanting, a circumstance fully accounting for the anomaly of the extraordinary continuance of the others.† The permanent teeth occasion the falling out of the milk ones principally by destroying with their pressure the vessels and nerves of the latter, as well as their adhesion to the alveoli. The destruction of the

* De l'Arrangement des Secondes Dents, ou la Méthode Naturelle de diriger la deuxième Dentition, &c. par M. Duval Broch, 8vo, Paris, 1820.

† Meckel, Manuel d'Anat. tom. iii. p. 359.

fangs is not an invariable effect, as the milk-teeth, when they are shed, sometimes have very perfect fangs.*]

In the formation, and especially in the cutting, of the third set, or WISE TEETH, we ordinarily meet with a far more considerable degree of pain and inconvenience, and this too for many weeks; and the pain spreads by sympathy to the ear, which is often more affected than the tooth itself. Such is especially the case where the formation takes place late, and after the jaw-bones have ceased to grow, and the gum has become thick and callous; for we have here a want of sufficient room, and little power of enlarging it by absorption. In the upper jaw, moreover, the tooth on each side is frequently obliged to incline backward, by which means it presses on the anterior edge of the coronoid process in shutting the mouth, which causes an additional degree of uneasiness; while, in the lower jaw, some part of the tooth continues to lie hid under the coronoid process, and the portion of the gum that covers it is perpetually liable to be squeezed by the tooth below, and the corresponding tooth in the jaw above. In this case nothing but a very free crucial opening will suffice; and often nothing but an excision of a very considerable piece of the callous gum: while there are other instances, in which the evil can only be cured by removing the tooth itself.

We sometimes, though rarely, meet with playful attempts on the part of nature to reproduce TEETH AT A VERY LATE PERIOD OF LIFE, and after the permanent teeth have been lost by accident or natural decay.

This most commonly takes place between the sixty-third and the eighty-first year, or the interval which fills up the two grand climacteric years of the Greek physiologists; at which period the constitution appears occasionally to make an effort to repair other defects than lost teeth, on which we shall have occasion to treat more at large, when describing that variety of decay, which in the present system is denominated climacteric.†

For the most part, the teeth, in this case, shoot forth irregularly, few in number, and without proper fangs: and even, where fangs are produced, without a renewal of sockets. Hence they are often loose, and frequently more injurious than useful, by interfering with the uniform line of the indurated and callous gums, which, for many years perhaps, had been employed as a substitute for the teeth. A case of this kind is related by Dr. Bisset Knayton, in which the patient, a female in her ninety-eighth year, cut twelve molar teeth, mostly in the lower jaw, four of which were thrown out soon afterwards, while the rest, at the time of examination, were found more or less loose.‡

In one instance, though never more than in one, Mr. Hunter§ witnessed the reproduction of a complete set in both jaws, apparently with a renewal of their sockets. "From which circumstances," says he, "and another that sometimes happens to women at this age, it should appear that there is some effort in nature to renew the body at that time."

GEN. I.
SPEC. I.

γ O. Dentitionis
Adulorum.
Adult-teething.

δ O. Dentitionis Senilium.
Climacteric-teething.

Examples of singular reproductions.

* Serres, op. cit. p. 102. † See Class III. Ord. iv. Gen. III. Spec. 2.

‡ Edin. Med. Comment. vol. viii. p. 373. § Nat. Hist. of the Teeth.

GEN. I.
SPEC. I.
O. Den-
titionis Se-
nilium.
Climacteric-
teething.

He alludes to a restoration of the catamenia, and to the climacteric change, which we shall have occasion to notice hereafter. The author of this work once attended a lady in the country, who cut several straggling teeth at the age of seventy-four; and at the same time recovered such an acuteness of vision as to throw away her spectacles, which she had made use of for twenty years, and to be able to read with ease the smallest print of the newspapers. In another case that occurred to him, a lady of seventy-six, mother of the late Henry Hughes, Esq. printer of the Journals of the House of Commons, cut two molares, and at the same time completely recovered her hearing, after having for some years been so deaf as to be obliged to feel the clapper of a small hand-bell, which was always kept by her, in order to determine whether it rang or not.

The German Ephemerides contain numerous examples of the same kind; in some of which, teeth were produced at the advanced age of ninety, a hundred, and even a hundred and twenty. One of the most singular instances on record is that given by Dr. Slade,* which occurred to his father; who, at the age of seventy-five, reproduced an incisor, lost twenty-five years before; and at seventy-seven reproduced another to supply a similar vacancy, so that at eighty he had hereby a perfect row of teeth in both jaws. At eighty-two they all dropped out successively; two years afterwards they were all successively renewed, so that at eighty-five he had once more an entire set. His hair at the same time changed from a white to a dark hue; and his constitution seemed in some degree more healthy and vigorous. He died suddenly, at the age of ninety-nine or a hundred.

Sometimes these teeth are reproduced with wonderful rapidity; but, in such cases, with very great pain, from the callosity of the gums, through which they have to force themselves. The Edinburgh Medical Commentaries† supply us with an instance of this kind. The individual was in his sixty-first year, and altogether toothless. At this period his gums and jaw-bones became painful, and the pain was at length excruciating. But, within the space of twenty-one days from its commencement, both jaws were furnished with a new set of teeth complete in number.

The jugglers on the continent, a century or two ago, were in the habit of taking advantage of this occasional playfulness of nature, and offering, as natural phenomena in the formation of teeth, singularities which nature never dreamed of. Thus, a boy was at times started and hawked about the country with a golden tooth, much to the astonishment of both the learned and the unlearned; for though the tooth was in reality a natural one, and only covered over with an inlay of gold, yet the gilding was in one or two instances so exquisitely effected as to deceive almost every spectator, when the trick was first brought forward, and to lay a foundation for no small number of learned descriptions and profound explanations upon the subject.‡

Pretended
reproduc-
tion by jug-
glers.

* Phil. Trans. vol. xxvii, year 1713. † Vol. iii. p. 105. ‡ Horstius, De Aureo Dente, Lips. 1695, 8vo. Ingolstetter, De Aureo Dente Silesiaci Pueri, Lips. 1695, 8vo. Tykobsky, Disquisitio duorum Puerorum, unus cum Dente Aureo, alter cum Capite Giganteo, ii Lituania visus, Olivæ, 12mo.

SPECIES II. *Odontia Dolorosa*.—*Tooth-ache*.*Acute pain in the Teeth or their involucres.*

THERE is often a considerable degree of pain of a particular kind that accompanies the irritation of the last species: but it is rarely, if ever, of an acute character; and is rather a sense of soreness about the tooth than an ache within it: and hence the definitions now offered are sufficiently distinct.

Pain of this kind may be produced by various causes, as a catarrh, or cold; an exostosis or deposit of earthy matter on the sides of a tooth or its socket; a caries or decay; a peculiar affection of the nerves of the sockets or jaw-bone, acting upon a tooth by contiguous sympathy, and hence not relieved by extracting the tooth that is suspected. It may be produced also by some remote influence, as that of pregnancy, or sordes in the stomach; by a peculiar diathesis, as that of rheumatism, or scurvy; by the long use of mercury; or by a transfer of action, as in some cases of gout, in which the pain is often most vehement and agonizing, and in various instances has produced convulsions, and in others delirium; or, in the language of the sufferers themselves, has actually driven them mad. In several of these cases, it occurs as a mere symptom of some other disease; and can only be cured by a removal of the disease that gives rise to it. The following varieties, however, seem well worth attending to, and will generally be found to result from a primary affection:

- | | |
|-----------------------|------------------------------------|
| α Catarrhalis. | From cold. |
| Catarrhal tooth-ache. | |
| β Cariosa. | From decay or caries. |
| Cariou tooth-ache. | |
| γ Exostosa. | From ossific deposit. |
| Nodose tooth-ache. | |
| δ Nervorum. | From irritability of the dental or |
| Nervous tooth-ache. | adjoining nerves. |

Every tooth has an internal cavity which commences at the point of its fang, and enlarges as it ascends into its body. This cavity is not cellular or rugged, but smooth on its surface: it contains no marrow, but appears to be filled with blood-vessels, accompanied with nerves, which must necessarily be derived from the second and third branches of the fifth pair, though they have never been distinctly traced. In the interior of this cavity the teeth appear to be peculiarly sensible; and hence direct or indirect EXPOSURE TO THE EXTERNAL AIR; or, in other words, a carious opening, or a current of sharp air without such opening (for the air seems in many instances to act through the substance of a sound tooth) will produce acute pain, and is, in fact, the common cause of tooth-ache. The pain thus produced will sometimes cease very suddenly, and especially upon the application of an opiate, or some acrid essential oil. But the irritation is often communicated to the periosteum of the tooth,

α O. Dolorosa Catarrhalis.
From cold.

Causes.

GEN. I.
SPEC. II.
α O. Dolorosa Catarhalis.
From cold.

and thence to the membrane that lines the socket which is only a duplicature of it. And hence, the pain will often become permanent from inflammation excited in these tunics, now thickened and tense, and at the same time incapable of relieving themselves by stretching; while, if a rheumatic or gouty diathesis prevail, the pain may become intermittent or periodical.

Treatment.

In all these cases, wherever we can trace in the tooth a hole opening externally, the readiest and most effectual modes of cure will consist in stopping up the hole with a metallic or some other substance, so as to defend the tooth from the access of cold; or in destroying the affected nerve by caustics or cauteries introduced through the hole itself. The pain may also be occasionally diminished by the application of opium or the more acrid aromatic oils, especially that of cajeput, which is a distillation of the leaves of *melaleuca leucodendron*, either directly to the nerve in the tooth, or to the extremity of those nerves in the skin, which are branches of the same pair. [An application, particularly recommended by Dr. Blake, at one of the meetings of the London Medical Society, is a solution of two drachms of alum in seven of the nitrous spirit of æther.] These medicines act by exhausting the sensibility of the nerve: and hence relief is procured by volatile alkalies and rubefacients; or by a blister behind the ear of the affected side; by burning the edge of the helix of the ear; rubbing the cheeks with the *cerambyx moschatus*, which possesses a vesicatory power nearly equal to that of the lytta; holding brandy or hot water in the mouth; or applying the sedative juices of the lady-bird or *coccinella septem-punctata*, as well as that of several other insects, to the tooth or gums, after bruising them for this purpose between the thumb and fingers. The root of the *peteveria aliacea*, or guinea-hen-weed, a very acrid plant, is employed for the same purpose by the inhabitants of Jamaica, who put a small plug of it into the diseased cavity.*

Irritants
generally.

So the mastication of various other aromatic or stimulating plants will often produce a similar effect, and especially those that at the same time rouse the ducts of the salival glands to increased action, as the bulbs of the alliaceous plants, the root of several of the seselis, particularly the *seseli vulgare*, the common hartwort, or *laserpitium siler*, Linn. which has long been celebrated both as a sialagogue and a remedy for the tooth-ache.

Masticato-
ries.

Such masticatories, however, are chiefly of use in the tooth-ache produced by rheumatism, or where congestion has taken place in the neighbouring parts from inflammation of any other kind. The sensibility of the nerves may hereby, indeed, be in some degree exhausted, but it is the evacuation that principally affords relief. And it is hence that relief is also not unfrequently obtained by smoking or chewing tobacco, and, as Dr. Cullen conceives, by the use of camphor;† though it appears probable that both the camphor and tobacco may partly operate by the

* Trans. Stockh. Acad. 1644, p. 287.

† Mat. Med. vol. ii. p. 304.

sedative power they possess. And as errhines promote the same secretion as sialagogues, these have also been frequently employed with considerable success, as well in tooth-aches as ophthalmies; in both which cases, however, preparations of asarum have generally been found to produce more alleviation than those of tobacco, which is the basis of our common snuffs. A local application of cantharides in powder or ointment is inconvenient, but the tinctura cantharidis may be often used effectually with little trouble; yet the most elegant form of this stimulant for the present purpose is that of the French Pharmacopœia, under the name of Oleum de Cantharidibus. It is made by digesting for six hours with a gentle heat, one part of powder of cantharides in eight parts of olive oil;* the oil thus impregnated is to be filtered, and is then fit for use.

GEN. I.
SPEC. II.
& O. Dolorosa Catar-
rhalis.
From cold.

Oleum de
Canthari-
dibus.

Electricity has also been tried, and occasionally with success. On the continent, magnetism has been a still more favourite remedy; and has at least more writers in its recommendation,† whatever be the actual benefit it may have produced, of which I cannot speak from personal knowledge. Animal magnetism seems at one time, indeed, to have been very extensively employed for this as well as for other severe pains; and if we may credit the writers of a century or a century and a half ago, with instant and specific effect.‡ The grand magnetiser of the day was the then celebrated Valentine Greatrake, who operated by stroking his hands over the parts affected, much in the same manner as Mr. Perkins of America not many years ago employed his metallic tractors.§ And as strong emotions of the mind are well known to every one to produce a more immediate influence on the tooth-ache than on any other disease whatever, we may readily account for the cures hereby produced in some cases. Confident hope is as strong a stimulant as terror; and the latter is well known to operate so generally, that it is a rare fact for a person to be actually suffering pain just before the operation of extraction.

Electricity.
Magnetism.

Animal
magnetism.

The stopping of a carious opening in a tooth should only be attempted when there is no pain; for otherwise the pain will be increased by the introduction of a foreign body. The substances chiefly employed for this purpose are gum-lac, bees'-wax, sealing-wax, tin, lead and gold. The metals, and especially tinfoil, are amongst the most useful, as they afford the best guard, and far less frequently require to be renewed. Yet none of them can be easily retained in cases where the opening is wider at the top than the bottom; and although attempts have been made to keep them in the proper situation by drilling a small hole through the sides of the teeth, and rivetting a pro-

Stopping
the carious
opening.

* Codex Medicamentarius, seu Pharmacopœia Gallica. Paris, 1818.

† De la Condamine, Journ. de Méd. tom. xxvii. p. 265. Glaubrecht, Diss. Analecta de Odontalgia, ejusque remediis variis, præcipuè Magneta. Argent. 1766. Teske, Neuer Versucht in Curirung des Zahnschmerzens vermittelst eines Magnetischen Stahls. Königsb. 1765-6.

‡ Schelhammer, Diss. de Odontalgia tactu sedendâ, Jen. 1701.

§ Stubbes, An account of several marvellous cures performed by the stroking of the hands of Valentine Greatrake. Lond. 1666. 4to.

GEN. I.
SPEC. II.
α O. Dolorosa
Catarhalis.
From cold.

per pin into the metallic substance, they soon become loose, and admit air, food, and other acrimonious materials.

Fusible
metal.

Mr. Fox makes mention of a compound metallic substance that had been recommended to him, as far better calculated to answer the purpose of a permanent plug than any of the preceding. It is, he tells us, obtained, by mixing several metals together, which by the process made use of, become fluid at the temperature of boiling water; on which account it has been called fusible metal. It is supposed that this may in consequence be employed in a liquid state, and thus have an opportunity of striking, before it becomes cool, into all the ramifications of the carious part, so as to fill up the cavity completely, and form a fixture not easily to be detached. [A more practicable method, perhaps, is that of Mr. Fay, who also employs some kind of amalgam, that melts at a low temperature. A small piece of it being placed in the tooth, an instrument heated in the flame of a spirit lamp is applied to the metal, and melts it. In this manner the metal takes the exact shape of the hollow, every part of which becomes filled up.]

Indissoluble
earths
proposed.

It has often occurred to me that some of the drying earths employed as cements by our stone-masons, and which harden into an indissoluble plate or mass under water, might be used with more success for this purpose than any other substance; especially tufa or tuffwacke, as Schmeisser calls it, and tarraas, which are compounds of iron, alumine, silex, and carbonate of lime. Introduced into the cavity of a carious tooth in the form of soft paste or mortar, they will easily dry and harden and adhere, and no moisture of the mouth will dissolve them.

Nerve stu-
pified or
destroyed.

If these methods should not succeed, we may attempt a cure by endeavouring to stupify the nerve of the tooth by a frequent use of hot essential oils intermixed with camphor and opium, or we may destroy it directly by a hot iron. And if these methods fail, and the excision of the crown of the tooth, as practised by Mr. Fay, should not be deemed advisable, the only alternative is extraction which, however, should never be had recourse to till the above plans have been skilfully tried; for, first, the pain may proceed from an affection of the socket, and in this case the pain of tooth-drawing will have been incurred for no purpose; and, next, a carious tooth, whose nerve has been destroyed or rendered torpid, may be of very essential service, as well as ornament, for many years, perhaps through the whole of life. Yet if the caries be accompanied with inflammation in the surrounding parts, the tooth should be removed without loss of time; as the mischief may spread, and the adjoining teeth be hurt.*

Extraction
of the carious
tooth.

[With respect to Mr. Fay's practice of excising the diseased tooth at its neck, its chief recommendation is the avoidance of the pain of extraction. The operation, which of course is only warrantable when the fang is free from disease, is performed

* Manuel du Dentiste, pour l'application des Dents artificielles incorruptibles, &c. Par C. Maury, 5 feuilles, 8vo. Paris, 1820.

with cutting forceps, expressly contrived for the purpose. Directly after its execution a piece of cotton wool dipped in oil of cajeput is applied. According to Mr. Fay, the canal in the centre of the tooth afterwards becomes filled up with bony matter, a point which it would be interesting to determine with certainty, not only with reference to the permanent efficacy of the operation, but to the disputed subject of the vascularity of the teeth. The first of these subjects, however, must, after all, require the sanction of general and large experience; while the latter would not be altogether settled in favour of the vascularity of the bony substance of the teeth, even where the canal in the fang proved to be filled up by a bony substance after the excision of the crown. In consequence of what Mr. Fay considers as happening, he inserts the stylet or pivot in the canal directly after the excision whenever it is intended to fix an artificial tooth.]

GEN. I.
SPEC. II.
α O. Dolorosa Catar-
rhalis.
From cold.

In extracting a tooth, a very troublesome hemorrhage will occasionally follow; sometimes profuse and of long continuance. Plater, Schenck, and others, have indeed given cases in which it has proved fatal.* [Mr. Blagden† has recorded the particulars of one very remarkable instance, in which the use of styptics, the actual cautery, a plug in the socket, and even a ligature on the carotid artery, failed to suppress the bleeding, which proved fatal a week after the removal of the tooth.] The best ordinary styptic is pressure with an elastic substance, as a piece of sponge covered with wax, touchwood, spunk, or some other spongy boletus, or a dossil of lint dipped in a strong solution of alum or sulphuric acid. I was not long ago requested to see a young man, who had been profusely bleeding from the gums and socket of an extracted tooth for five days without cessation, and without sleep, till his wan cheeks and faint emaciated frame seemed to indicate that he had scarcely any blood left in his vessels. He was so weak as to be incapable of rising from his bed or taking food; and his stools, from the quantity of blood he was perpetually swallowing, had all the appearance of a melæna. On opening his mouth I found it crammed full of lint wadding, one piece having every hour been added to another, without a removal of the preceding, lest the hemorrhage should be increased, whilst the blood in which the wadding was soaked, and which had remained in the socket and over the gums for so long a period, was become grumous, putrid, and intolerably offensive.

Hemor-
rhage, how
to be treat-
ed.

I first removed the whole of this nauseating load from the patient's mouth, and gave him some warm brandy and water to wash it with. I next directed him to take a goblet of negus with a little biscuit sopped in it, a part of which he soon contrived to swallow. The bleeding still continued: but as I had no doubt that this proceeded entirely from a total want of power in the lacerated arteries to contract, I applied no pressure of any

* Plater, Obs. Lib. III. p. 773. Schenck, Lib. I. Obs. 403. 405, p. 99.

† Med. Chir. Trans. vol. viii. p. 224.

GEN. I. kind, but prescribed a gargle of equal parts of tincture of cate-
 SPEC. II. chu and warm water ; and the hemorrhage soon ceased.

α O. Dolorosa Catar- It is not easy to explain by what means teeth become carious.
 rhalis. Out of the body they are indestructible, except by very power-
 From cold. ful chemical agents ; and yet, in the opinion of many physiolo-
 Caries, how gists, they are nearly in the same state in the body as out of it ;
 produced. extraneous substances, formed complete at first, without vascular-
 ity, growth, or interstitial action, and even destitute of ab-
 sorbents.

Whether
the teeth be
an extrane-
ous body.

In caries of the bones, observes M. Auzebi, the decayed part is thrown off, and gives place to a new growth : while, in the teeth, if the enamel be broken, and a caries commence, the carious part is never thrown off as in the bones, but continues its progress through the parts adjoining ; nor can any remedy we know of produce a separation between the part that is sound and that which is unsound. And we have hence, says he, a proof that there are no vessels in the substance of the teeth, and that they have a distinct conformation from other bones.* Not widely different was the opinion of Mr. J. Hunter, when composing his *Natural History of the Human Teeth* ; an opinion drawn from the impossibility of injecting them, the perfection in which they are produced at first, and their retaining their natural colour after so long a use of madder as food that all the other bones of the body have become thoroughly tinged with it. " But they have most certainly," says he, " a living principle, by which means they make part of the body, and are capable of uniting with any part of a living body ; and it is to be observed, that affections of the whole body have less influence upon the teeth than upon any other part of the body. Thus, in children affected with the rickets, the teeth grow equally well as in health, though all the other bones are much affected ; and hence their teeth being of a larger size in proportion to the other parts, their mouths are protuberant." Cuvier, who has adopted all Mr. Hunter's views, has employed the same reasoning ;† and M. de Blainville has apparently gone beyond both ; for he has denied not only a vascular structure, but even a living principle to the teeth.‡

Authorities
in support
of this opin-
ion.

Mr. Fox, however, is said to have succeeded in ejecting both the external and internal layer of the dental germ, and even Mr. Hunter himself appears to speak with some degree of hesitation in the treatise before us ; and in his subsequent treatise " *On the Diseases of the Teeth*," offers observations that seem to show he had at that time embraced a different opinion. In the first essay, indeed, he allows that " the fangs of teeth are liable to swellings, seemingly of the spina ventosa kind, like other bones ;" but he immediately adds, that " there may be a deception here, for the swelling may be an original formation." Yet, in the second essay, he treats of this swelling as one of the diseases to which the teeth are perpetually liable ; he regards the

* *Traité d'Odontalgie, où l'on présente un système nouveau sur l'origine et la formation des Dents, &c.* Lyons. † *Dict. des Sciences Médicales, art. DENTS.* ‡ *Nouveau Dict. d'Hist. Naturelle, &c. vol. ix. in verbo.*

teeth as subject to the common inflammation of other bones, and, like other bones, evincing, at times, great sensibility through the entire substance of the organ, as well as in the central cavity itself.*

GEN. I.
SPEC. II.
α O. Dolorosa Catar-
rhalis.
From cold.
Possess an
internal
action.

Probably some internal action is continually taking place in the teeth, though we are not able to trace it very evidently. The chief causes of a caries are undoubtedly external, but it may be sometimes produced by an internal cause. We have already noticed exposure to currents of cold air, and the medical practitioners of Germany and the north appeal to the opposite extreme of the habitual use of hot aliments, as a still more general and mischievous source of the same evil. In the Swedish *Amœnitates Academicæ*† we have an elaborate examination of this subject by M. Ribe, who tells us, among other things, that "man is the only animal accustomed to hot foods, and almost the only animal affected with carious teeth." Whence the author takes occasion to condemn, in an especial manner, the custom of drinking hot tea and coffee; and, in accordance with this remark and recommendation, M. Tillæus, another celebrated writer in the same interesting journal, tells us from Kalm, in his paper entitled *Potus Theæ*, that the Indians of North America knew nothing of the inconvenience of carious teeth or debilitated stomachs, till tea was introduced among them. There can be no question that the two extremes of heat and cold must be greatly, perhaps equally injurious to the health; and as little, that the inhabitants of high northern latitudes must suffer more than others from the use of hot aliments, in consequence of the greater coldness of their atmospherical temperature.

Hot be-
verages in-
jurious.

To the abuse of hot beverages as a cause of caries, M. de la Salle adds the abuse or excessive employment of sugar; and seems to imagine that these are the two principal means by which teeth are rendered black in their enamel, and carious in their substance.‡

How far
sugar is
injurious.

If sugar act at all, it must be by means of the principle of acidity which is contained in it; and, consequently, in proportion to the degree of affinity which this principle bears to the earthy matter, or calcareous basis of the teeth and their enamel, beyond that of the acids which enter into their natural composition. And the same may be observed in respect to any other exotic acid whatever.

If, then, we examine the composition of teeth chemically, we shall find, that in their structure they consist very largely of phosphate of lime, with a small proportion of animal matter, and a much smaller of carbonate of lime; and in their enamel, which is altogether of the nature of ivory, that they consist almost entirely of phosphate of lime, with a small proportion of animal matter, and a minute trace of fluete of lime. And admitting that the same decompositions take place in an organized

* At the end of this section the editor has introduced the chief arguments against the vascularity of the teeth. † Vol. vii. art. 136.

‡ Journ. de Méd. tom. xxxvii. appendix, p. 399.

GEN. I.
SPEC. II.
α O. Dolorosa Catarrhalis.
From cold.

living structure, or a simply organized structure in a living frame, as when the principle of life has no concern, we have next to enquire whether there be any acids that have a stronger affinity for lime than the phosphoric, for it is scarcely necessary to extend our research to the carbonic, since this can never be attacked till the enamel into which the phosphoric so largely enters be decomposed and withdraws its protection.

What acids chiefly affect the teeth.

Now, by examining the tables of elective attractions we shall find that there are four, and only four, acids that precede the phosphoric in their affinity for lime; the oxalic, sulphuric, tartaric, and succinic. We have daily proofs that the teeth, in the living subject, are greatly injured by the frequent or habitual use of several of these acids. I have at this moment a lady under my care, who till of late possessed as sound and fine a set of teeth as can any where be boasted of. From a peculiar delicacy of constitution, however, it has been judged requisite that she should, among other medicines, use a very large quantity of sulphuric acid. This prescription has been continued for many months, and her general health is considerably established: but, owing to her not having taken all the precaution that is requisite to guard the teeth while swallowing the acid, the pearly enamel is becoming yellow, and its coating very considerably diminished in thickness, so that at the apex of the incisors it is almost as thin as a razor, and is frequently chipping off.

Sulphuric acid.

Sugar not strictly an acid.

Sugar can have very little effect in destroying the enamel of a tooth; for, though it contain a principle of acidity, it cannot with propriety be regarded as an acid. It may give forth this principle by fermentation, in which case it will form acetous acid; or it may give forth the same principle by distillation with nitric acid, when it will form genuine oxalic acid, (for that which exists already formed in the *oxalis acetosella*, or wood-sorrel, is precisely of the same kind); and, in this combination, will evince a stronger attraction for lime than any other acid whatever. But of itself, and without this combination, we have no reason to suppose that its action, if there be action at all, can be otherwise than extremely weak. [General de Beaufort ate a pound of sugar every day for forty years, and lived to the age of seventy. After death his teeth were found to be quite sound.* Plenck kept a healthy tooth in some diluted syrup two months, at the end of which time it had undergone no change.†] If, in truth, it were a solvent of calcareous matter of any kind, it would first show itself in dissolving, and consequently preventing a lodgment of the carbonate, or phosphate of lime, which the salivary glands are so continually secreting, and which is perpetually incrusting on the neck of the teeth in mankind, and separating them from the surrounding gums; and hence sugar would be one of the best preservatives against such an encroachment. But as we do not find that those who use a

* Anecdotes de Médecine, tom. ii. p. 35.

† Doctrina de Morb. Dentium, p. 52.

large quantity of sugar are freer from this excrementitious matter than those who abstain from it altogether, we have again no reason to suppose that it is a solvent of the enamel of the teeth in any material degree.

It will be well to bear these remarks in memory in the composition of dentifrices containing acids of any kind. For the reasons already assigned, the oxalic, sulphuric, and tartaric acids, ought at all times to be sedulously avoided: and hence cream of tartar, which enters so generally into their composition, should in like manner be rigidly proscribed: while those which have the least chance of doing mischief from their very slight affinity for lime, are the citric, benzoic, acetic, and boracic. Yet even these have a stronger attraction than the carbonic acid; and hence, whenever teeth are deprived of their enamel, or the naked fangs become exposed by a decay of the surrounding gums, these also must in like manner be abstained from.

By whatever means a decay or caries of the teeth may be produced, it appears to operate in three different ways; sometimes commencing in the internal cavity, and working its course outwards; sometimes commencing outwards, and working its course within; and sometimes by a wasting of the enamel, and consequent denudation of the bony part. The first, which is the least common affection (its reality being denied by several writers), is discoverable by an appearance of blackness within the whiter surface of the tooth; the third is often to be met with; but the second is the most frequent of the whole; evincing at its commencement the appearance of an opaque white spot through the enamel, which gradually crumbles away about the spot, and thus discloses that part of the body of the tooth which forms the original seat of the affection. The disease, by its continuance, converts the spot into a hole, and at length destroys the tooth altogether, or at least down to its neck, unless the pain produced by the morbid progress compel the patient to have it extracted before the disease advances thus far.

Caries of the teeth does not appear to be a disease of any particular age, or temperament, or state of health. It exists in infancy, and in the firmest manhood, as well as in old age. In the last, indeed, the teeth that drop out from absorption of their alveoli, are often as sound as when they were first formed; while in childhood it has sometimes spread from tooth to tooth so extensively, and at the same time produced so much torture, that it has been necessary to extract almost every tooth before the sixth or seventh year. Mr. John Hunter hence conceived that a decay of the teeth was rather a disease of early than of advanced life; and that the teeth did not become carious after fifty years of age. Mr. Fox, however, observes, that he has met with several persons, who had not only passed fifty years without having had a caries in this organ, but who had been obliged after having arrived at sixty to have several teeth extracted in consequence of tooth-ache produced by a caries. In some general diseases of the constitution, the teeth seem to

GEN. I.
SPEC. II.

α O. Dolorosa Catarrhalis.

From cold.

Caution in the composition of dentifrices.

How a caries operates.

Common to all ages and temperaments.

GEN. I.
SPEC. II.
α O Dolorosa Catarhalis.
Pearly gloss of teeth in phthisis.

possess a singular degree of health and even luxuriance. Thus in phthisis it is almost a proverbial remark, that the white and pearly gloss of the enamel, which is peculiarly characteristic of soundness, is more than ordinarily clear and bright; while in rickets, in which the whole frame of the bones is shaken, and many of them become soft and spongy, the teeth ascend as firmly and as regularly as if the system were in a state of the most vigorous health.

β O. Dolorosa Exostosa.
From ossific deposite.

If the teeth be vascular, there is no great difficulty in conceiving that, like other bones, they may be subject to EXOSTOSIS, or a deposite of ossific matter on their surface, and particularly on the surface of their roots or fangs; [a case, which the non-believers in the vascularity of the teeth ascribe to original malformation. What is called an exostosis of the fang exhibits no irregularities on its surface, as other exostoses usually do; nor is its substance at all different from the rest of the fang. It is, in short, merely an accidental difference of form, where, as the offices of the part require no definite figure, variations in form are quite common.*] The author conceives, however, that whether the crown or body of the teeth be possessed of secernents in a mature state, they must have absorbents, since we behold their fangs, in very numerous instances, diminished, shortened, and truncated, and sometimes entirely carried away, which it is difficult to conceive can be done by the absorbents of any adjoining organ. And we may lay it down as a general rule, that there is no organ in possession of absorbent vessels, which does not at the same time possess secernents, so as to maintain a balance of action. We find on extracting a tooth that has long been a cause of considerable pain, that the fangs at least are considerably encrusted with a deposite of ossific matter, so as to give it an appearance of that disease which was formerly but most incorrectly denominated a spina ventosa. And on examining the state of the alveoli after death, we find also that similar morbid apophyses have pullulated occasionally from the face of the alveoli.

Teeth possess absorbents.

And hence most probably secernents.

Symptoms.

Wherever such effects occur, whether in the alveoli or the teeth, a considerable degree of pain, and generally an increasing degree, must be the result, from the pressure of the bony projections against the periosteum or alveolar membrane. At first this pain is not quite so acute as in carious or nervous toothache, for the imprisoned tunic is not at this time in a state of irritation. But, by a continuance of the pressure, it is soon reduced to this state, when the pain will be as severe as on any other occasion, and far less mitigable.

Treatment.

Wherever we can satisfactorily decide upon the cause, and the complaint is recent, we may often put a check to it by a free application of leeches, and the local use of mercurial ointment, or a mercurial plaster. But in cases of long standing, the only cure is an extraction of the tooth; for even if the disease be seated in the socket, it will be instantly arrested by this process,

* See Rees's Cyclopædia, art. CRANIUM.

as the substance of the socket, no longer of any use, will from this time be in a state of absorption, and be at length entirely removed.

GEN. I.
SPEC. II.

There is sometimes a PECULIAR IRRITABILITY IN THE NERVES OF THE TEETH themselves, or of those parts by which they are immediately surrounded, and with which they participate in action, that excites the sensation of severe and even agonizing tooth-ache, without caries or any other concomitant. In this variety the exact seat of pain is less easily defined than in the preceding; and there being no black spot or other external mark to direct us to it, the tooth is often mistaken in the continuous sympathy excited, and a sound tooth is extracted in its stead; so that the torture remains unabated. And there are instances in which the plan of extraction has been followed up from tooth to tooth without any alleviation whatever, till the jaw has been entirely divested of its teeth on the disordered side.

γ O. Dolorosa Nervorum.
From irritability of the dental or adjoining nerves.

This is often an idiopathic affection dependant upon a peculiar irritability; from a cause we cannot easily trace, of the nerves subservient to the aching tooth, or the tunics by which it is covered, or the periosteum, or the fine membrane that lines the interior of the alveoli. But it is more frequently a disease of sympathy, produced by pregnancy, or chronic rheumatism, or disorder of the stomach, in persons of an irritable habit. For this remote or indirect influence it is not difficult to account, when we reflect that the great intercostal nerve, emphatically called the sympathetic, and connected by ramifications with every viscus of the chest and lower belly, is connected also, by its union with a branch of the fifth pair, with the nerves that immediately supply the teeth, and which hence become its indirect extremities.

It is still less to be wondered at, that the nerves of the teeth should often associate in the maddening pain of *neuralgia faciei*, or *tic douloureux*; for here the connexion is both direct and immediate. In consequence of this the patient, in most instances, regards the teeth themselves as the salient point of pain (and they may unquestionably be so in some cases), and rests his only hope of relief upon extraction, although, when he has applied to the operator, he is at a loss to fix upon any one tooth in particular. Mr. Fox gives a striking example of this in a person from whom he extirpated a stump, which afforded little or no relief; in consequence of which his patient applied to him only two days afterwards, and requested the removal of several adjoining teeth which were perfectly sound. This he objected to, and suspecting the real nature of the disease, he immediately took him to Sir Astley Cooper, who, by dividing the affected nerve, produced a radical cure in a few days.

Neuralgia faciei mistaken for tooth-ache.

Where the pain, therefore, proceeds from sympathy, it is of the utmost importance to trace it home to the organ idiopathically affected, for to this the attention should be chiefly directed. Where it exists as a primary disease, it is often of long duration, and difficult removal. Sometimes narcotics, and sometimes stimulants, have been found most successful: blisters have occasion-

GEN. I.
SPEC. II.
O. Dolorosa.

ally relieved; and the burning of a little cone of moxa behind the ear, more frequently and more effectually. Of narcotics applied locally, hyoscyamus appears to be one of the best. Its seeds may be put to the cheek in the form of a cataplasm; or their smoke conveyed by a funnel to the tooth itself. In this last form, it will often allay the pain of a carious tooth. Where the pain is remittent or periodical, a free use of the bark with change of air has proved most salutary.

Vascularity
of the teeth.

[From the preceding observations it appears that the author of the present work joins those physiologists who regard the teeth as vascular, and even carried this belief so far as to express a suspicion that these organs sometimes undergo an increase of size, whereby the interspace produced between two of them, by the extraction of one, may be considerably lessened. In the last edition of this book, he mentioned the fact as having occurred in his own jaw, after the removal of one of the bicuspidati, when he was a boy. That the teeth frequently approach each other, so as to lessen, and even nearly fill up, the interspace occasioned by the extraction of one of these organs, is an undoubted truth; but the correct explanation of its cause is not the enlargement of the teeth, but the change that follows in the situation of the socket. Hence, when a tooth is removed from a young subject, whose jaw is yet growing, the interspace may become in time nearly obliterated. If the gap were filled up by the expansion of the adjoining teeth, this could only happen from the enlargement of the crowns; but, though specimens of exostoses and swelling of the fangs of teeth are contained in museums, the editor has never yet met with a tooth, whose crown or body was enlarged.

The question whether the teeth are vascular is extremely curious and interesting; and so unnatural is the idea of an harmonious connexion between dead and living substances, that the common opinion of the teeth being furnished with vessels and nerves is not at all surprising. Nay, the excessive pain often seated in these organs, and the remote, diversified, and very severe disorders which they appear to excite sympathetically in the animal economy, are circumstances presenting something like a confirmation of the doctrine. Nor can it be denied, that much difficulty occurs in accounting for certain changes in the teeth, unless this doctrine be admitted. But it is not because we cannot explain precisely the nature of every particular alteration or appearance of these organs, without supposing them to be vascular, that they must really be so; for, if some of the phenomena in question take place also in artificial teeth, and in teeth which have been boiled, or kept so long in a drawer as not to admit of the suspicion of their being alive, the doctrine then immediately becomes a questionable hypothesis.

The difficulty of accounting for caries of the teeth, and for the absorption of their fangs, unless the belief in the vascularity of these organs be adopted, seems to have had great influence in determining the author of the "Study of Medicine" to consider the substance of the teeth as vascular. That he was also correct

in his notice of the disagreement between Mr. Hunter's Natural History of the Human Teeth and the Essay on their Diseases by the same distinguished man, is a truth of which no person who has read these works can doubt. The subject was difficult, so difficult as even to involve Hunter in hesitation, if not contradiction. Our author has not mentioned, however, some of the principal facts and arguments which such modern physiologists as disbelieve the vascularity of the teeth generally bring forward: a short account of them in this place may not, therefore, be uninteresting.

GEN. I.
SPEC. II.
O. Dolorosa.

In the last edition of this work, it was remarked by the author that, "admitting the soundness of Mr. Hunter's experiments, and the accuracy of his reasoning, it seems impossible that the teeth, when once perfectly produced in the gums, should ever decay; for no action of the living principle can occasion a secretion of those chemical agents which would alone, in such case, be capable of destroying them." We have seen, also, that our author describes one form of caries as beginning within the tooth. Others, however, deny the reality of the latter case, and, if they are right, the answer is at once given to the foregoing argument. They distinctly allege that caries never begins within the tooth; but a speck is first seen upon the enamel, a portion of which being destroyed, the decay extends to the bone of the tooth, and proceeds from the surface into the cavity. As soon as the bone begins to be affected, the progress of the decay is much more rapid; an excavation is produced; and the enamel is left in the form of a hollow shell. The following considerations are mentioned as proofs that the decay is not the effect of vascular action. It first attacks the enamel, which is confessedly not vascular; for though Bichat regarded this substance as sensible and organized, because acids set the teeth on edge, the fact is, that the disagreeable sensation here adverted to is not situated in the enamel itself, nor is it ever excited by an acid merely applied to it. The acid must at the same time come into contact with the organ of taste, or extend its action directly to the sensible parts within the cavity of the tooth.

Throughout the whole process of caries, there is no attempt at reparation. Artificial teeth are as much subject to decay as natural ones. The discoloration has, indeed, been sometimes thought to be more deep in the artificial teeth, made of the tooth of the hippopotamus, than in the human teeth; but, in engrafted human teeth, the decay is acknowledged to be precisely similar to that of the natural ones.*

The alleviation of tooth-ache by the application of muriatic acid, nitrate of silver, and other caustics to the carious surface, has been esteemed a proof that the caries is an ulcer, and that its irritability may be destroyed by such treatment. Since, however, the remedies may act upon the exposed vascular contents of the cavity of the tooth, or may affect these contents by penetrating through the thin medium which remains, it is manifest

* Rees's Cyclopædia, art. CRANIUM.

GEN. I.
SPEC. II.
O. Dolorosa.

that they can afford no proof of the point in question. At the same time, it is to be taken into the account, that tooth-ache from caries may frequently be relieved by a plan nearly amounting to a demonstration that the pain does not arise from the ulcerated surface, but from the nerves in the cavity; namely, let the decayed hole be stopped up (which is rather a rude method of treating an irritable ulcer) so as to prevent the access of the external air, and of foreign bodies, and the pain will cease.

The writer from whom the editor has borrowed these judicious reflections further observes, that it is not perhaps so easy to determine what the decay is, as what it is not. Those who consider the teeth as destitute of vessels ascribe their decay to the chemical action of the secretions in the mouth, and of the articles of food. Here it is difficult to comprehend how a cause, which must necessarily be so general in its application, should be so circumscribed in its effects; never producing decay at once in an extensive surface, but, in its commencement, limiting its action to a small spot. However, in artificial teeth, a large surface sometimes decays under circumstances favouring an accumulation of fluids in a particular part; viz. the portion that corresponds to the gum, and is usually grooved, and also the lateral parts of such teeth.

Various considerations strengthen the inference that the decay of the natural teeth must depend upon a chemical, and not a vascular operation. It commences in those situations where food or extraneous matters are most liable to lodge, as between the teeth, and near the neck, just where the gum adheres. It is checked by stopping up the hole, and preventing the entrance of the food and secretions of the mouth into it. It is most frequent in the higher classes of society, whose food is of the most unnatural and miscellaneous kind. It is very rare in the teeth of savages, and it is alleged never to occur in animals. In twelve or fourteen skulls, discovered in two barrows opened in Gloucestershire, not a single decayed tooth was noticed. Now, as this mode of burial has not been employed for the last six centuries, these skulls must have belonged to a time when the modern habits of luxury, in respect to food, were unknown; and when the effects of such habits on the teeth were, of course, not discernible.* One fact connected with the foregoing statements, and perhaps in some degree throwing a doubt on part of them, is the extraordinary prevalence of caries of the teeth in particular families, seemingly as if there were some original hereditary imperfection in them, whereby the causes of caries, whatever they may be, very readily produce their destructive effects. Another fact, universally acknowledged, is the frequent and almost regular occurrence of fine sets of teeth in certain families through a long series of years; a fact that seems, like the preceding one, to imply some hereditary differences in the degree of perfection of these organs. That persons who smoke tobacco generally have discoloured carious teeth is a fact uni-

* Rees's Cyclopædia, art. CRANIUM.

versally recorded. Perhaps, therefore, the ingenious author of the present work was mistaken in supposing that the production of caries of the teeth could not be chemically accounted for, unless the secretion of chemical agents within them were admitted as a fact, which fact would, of course, imply vascularity. The caries, instead of beginning sometimes internally, as he supposed, always commences externally in the enamel, and proceeds from it into the bone of the tooth, so that the fluids, and other matters in the mouth, have direct access to the affected surface. An inward decay of the teeth, with the whole shell of enamel perfect, is talked of by dentists; but, though the external aperture may be minute and concealed, its existence must not be denied, until a contrary case can be fully demonstrated.

Our author supposed that madder and anatomical injections might not be sufficiently attenuate to enter the vessels of the teeth, and was not disposed to receive the fact of those substances not entering them, as a proof of their non-existence. Certainly, in several instances, to conclude that parts are not vascular because the vessels cannot be injected, would be decidedly erroneous. But, in these particular cases, the phenomena of disease enlighten us, and correct our judgment; which can hardly be said to occur with respect to the teeth, for their changes, whether vital or chemical, are enveloped in the deepest mystery. As for the experiments with madder, however, they furnish the strongest argument of all against the vascularity of the fully formed substance of the teeth, without even affording the least room for the argument that madder is not subtle enough to enter the vessels of those organs. This will be immediately evident, when it is recollected, that while the tooth of a young animal is only partly formed, if madder be given with the food, it is really transmitted by the vessels of the pulp, not indeed to the portion of the tooth already complete and void of vessels, but to that part of the organ which is developed subsequently to the beginning of the experiment, and is the work of the vessels of the pulp. Here, however, a most interesting fact was pointed out by Mr. Hunter; namely, that when the tooth of a young animal has thus been tinged with madder, the stain is never afterwards removed, which is exactly the reverse of what occurs in bones dyed by feeding animals with the same substance. The bones, therefore, must have vessels for the conveyance of the madder into them, and other vessels by which it is again removed from them. On the other hand, though the vessels of the pulp seem capable of communicating the red tinge of madder to the bone of the tooth, upon its first deposition, they appear directly afterwards to have no further communication with the new formation, which remains incapable of every change usually produced in other parts through the medium of arteries, veins, and absorbents.

These conclusions, deduced from experiments with madder, may be set down as firmly established, without being at all weakened by an observation made by the late Mr. Gibson; namely, that the fact of the power of madder to redden the

GEN. I.
SPEC. II.
O. Dolorosa.

GEN. I.
SPEC. II.
O. Dolorosa.

bones is no demonstration that a continual renovation of their particles takes place.* Madder communicates to the bones a red tinge, which is afterwards gradually removed: these two facts prove, at all events, an interstitial action, as far as that substance is concerned, and thus are explicable only on the principles of vascularity and life. Just so the communication of a red tinge by madder to the phosphate of lime of a tooth that is undergoing development is a tolerably convincing proof that vessels then deposit both the earthy and the colouring matter; while the permanency of the tinge as clearly shows that the coloured particles of lime in the tooth are not absorbed again, and that no vascular interstitial changes afterwards occur.

In confirmation of the preceding view, it deserves particular notice, that the teeth never exhibit any appearances of reparation, under circumstances of accidental injury or supposed disease. The loss of substance occasioned by the friction of mastication is not repaired; a part broken off is not renewed, but the fractured surface remains unchanged; a hole, caused by decay, is never filled up again. The union of a fracture near the neck of a tooth, even if it be possible, as M. Duval† and others declare, does not at all invalidate the foregoing statement, because the union is ascribed to the action of the pulp, and not to that of vessels within the substance of the tooth itself.

The non-existence of vessels in the teeth may be inferred from another particular case; a violent blow sometimes causes a general discoloration of a tooth, as if blood were effused through all its texture. This appearance is explicable, either by supposing vessels to exist in the substance of the tooth, which pour out the blood in consequence of the injury, or by supposing that the vessel in the fang is ruptured, and that the extravasated blood mechanically discolours the substance of the tooth. If the former explanation be adopted, the colour ought not to be permanent; for wherever there are arteries, there must also be absorbents; and these ought to remove the effused blood, as they do in bruises of the soft parts. By the other explanation, we gain a satisfactory solution of the difficulty; we account for the duration of the colour in the tooth in the same manner as of that which arises from feeding a young animal with madder.

The teeth are exempted from all those diseases which ravage the bones: lues venerea, scrofula, and rickets, which attack all other bones, never produce the slightest effect on the teeth, which remain unaffected even in cases of *mollities ossium*, where all the other earthy matter of the system is absorbed. In short, the teeth never have the slightest participation in general affections of the constitution. Their substance also never swells from inflammation; it never throws out a fungus or exostosis; for what has received this name is in all probability an original malformation, as Mr. Hunter first suggested. Ossific depositions may be conceived to arise from the vessels of the pulp, or those

* See Mem. of the Literary Society of Manchester, 2d Series, vol. i. p. 146.

† Dict. des Sciences Méd. tom. viii. p. 335.

of the membranous lining of the fang, so as to lessen, or even obliterate, the cavity or canal; a change said to happen in old age, without supposing any part of the change to result from vessels in the substance of the bone. The same substance never exfoliates. Whole teeth are sometimes included in an exfoliated portion of the jaw; but then they are not altered in structure or appearance, which is another proof of their want of vascular connexion with the rest of the body. If, says a well-informed writer, it be said that these teeth are dead, like the bone which contains them, we would ask, what are the distinctions in appearance between a dead and a living tooth? Are they to be ascertained by inspection in the living body, or can they even be demonstrated by anatomical investigation? The absorption of the fangs of the temporary teeth cuts off the vessels long before these teeth are actually shed; yet there is no sign nor character by which a tooth, whose vascular supply is thus intercepted, can be distinguished from another in which it remains unimpaired.*

GEN. I.
SPEC. II.
O. Dolorosa.

As is remarked by the same author, the difference between the growth of the teeth and that of the bones is particularly striking. In the cartilaginous epiphysis of a young bone, vessels are seen entering from all sides; in the centre there is a small bit of bone, of a loose and spongy texture, which can be made quite red by injection. We can trace this hardening, through every intermediate stage, to that of perfect bone, the vessels of which, even in its most compact state, are still easily demonstrable. Let us compare with this the growth of a tooth. If we examine it at ever so early a period, when a speck of ossification only can be discerned, the part which is thus formed is complete, and has all the properties which belong to the bone of the perfect tooth. It does not undergo that gradual development which is seen in the growth of bones; but the smallest point, when once formed, never alters. In cartilaginous epiphyses, the central portion of bone is imbedded in the cartilage: numerous vessels can be traced into it on every side; while in a truth, the ossification does not go on in the centre of the pulp, but the bone covers it like a shell. The connexion between them is merely that of contact of surface, and there is no discoverable vascular union.

If any argument be drawn in favour of the vascularity of the teeth, from the fact of blood being sent into their cavity, it must be immediately weakened by the reflection that the intention of various other arrangements in the structure of the body is completely mysterious. Thus, we know as little why male animals have mammae and nipples, as why the cavity of a tooth should contain vessels apparently for no purpose.

Argument from blood being sent into a tooth.

With respect to the circumstance of a yellow colour being communicated to the bone of the teeth, in jaundice, it is no proof of their vascularity. As is well remarked, the argument would prove too much. The vessels of the teeth, if any such

From yellow colour of the teeth in jaundice.

* Rees's Cyclopædia, art. CRANIUM.

GEN. I.
SPEC. II.
O. Dolorosa.

exist, are so minute that they neither convey red blood nor coloured injection; yet they are capable of carrying so much bile, as to tinge the tooth of an uniform yellow to a certain distance from the cavity. If this colour be then owing to a yellow fluid, contained in vessels, these must be so numerous as to render the tooth much more vascular than any other bone. The fact is, that the vessels of the pulp contain bile, and dye this part of an uniform yellow colour, which is mechanically imparted to the adjacent bone in the neighbourhood of the cavity; the effect gradually ceasing at a little distance from it. The stain is produced, just as it is by immersing the teeth in bile after death.

From their
transplant-
ation.

Another proof of the vascularity of the teeth is attempted to be taken from their successful transplantation from the jaw of one person to that of another, or to parts of another animal's body, as the comb of a cock. These experiments, however, will succeed with dead teeth. The writer of the article CRANIUM in Rees's Cyclopædia has seen a cock, in whose comb the late Mr. Moor, the dentist, had inserted a tooth that had previously lain many months in a drawer; and it was firmly adherent. This adhesion then does not seem to require even the living principle, of which it was regarded by Mr. Hunter as a proof.

From the
growth of
the incisors
in the glires.

But no arguments have been more confidently employed by the believers in the vascularity of the teeth than those deduced from comparative anatomy. Animals of the class glires, as the beaver, hare, rabbit, squirrel, rat, mouse, &c. have two very large incisor teeth in each jaw, which, being employed in cutting various hard bodies, wear down very rapidly. Hence, if these animals be kept entirely on soft food, their teeth grow out to a great length: and if these teeth be lost from one jaw, the opposite ones grow out in the same way. This constant growth is effected in the same manner as their original formation. They are hollow, and contain a pulp, which continues to deposit fresh substance below, in proportion as their upper part wears away. The tusks of the elephant and hippopotamus have a similar power of growth.* It seems now, indeed, to be the common belief of some of the first physiologists, that the teeth really present a strong analogy in their development to the hair, nails, and horns of the animal body, and also as M. Geoffrey St. Hilaire has fully ascertained, to the beaks of birds. In the human subject, the process by which the teeth are formed confirms this doctrine; but, as we have noticed, what happens in the incisor teeth of the gnawing animals is a still closer analogy, since the pulp retains for an indefinite period the power of secreting additional matter, by which the effects of the loss of the tooth at its cutting end are counteracted, and an incessant tendency to elongation, or growth, kept up in the organ. A list of distinguished authorities, and a brief notice of

Analogy
between
teeth and
horns, nails,
&c.

* See Rees's Cyclopædia, art. CRANIUM.

some of the arguments in support of this physiological view of the nature of the teeth, are given by Meckel.*

Bullets have been occasionally found imbedded in the tusks of elephants. Now the advocates for the vascularity of the teeth have argued, that the closure of the opening, by which the ball entered the tusk, and the swelling sometimes observed in these cases opposite the foreign body, could not have taken place without the agency of vessels. However, these occurrences are now satisfactorily explained, without having recourse to this hypothesis. The tusks are constantly growing during the animal's life, by a deposition of successive laminae within the cavity, while the outer surface and the point are gradually worn away; and for this purpose the cavity is filled with a vascular pulp, similar to that in which the teeth are originally formed. If a ball penetrate the side of a tusk, cross its cavity, and lodge on the opposite side, it will become covered towards the cavity by the newly deposited layers of ivory, while no opening will exist between it and the surface to account for its entrance.† All the various appearances, attending the lodgement of bullets, and pieces of other weapons, in the tusks of elephants, can be accounted for by the power of the pulp connected with these organs.

As for the author's supposition, that the occasional absorption of the fangs of teeth is a proof of absorbents in them, the fact only shows that those parts are capable of being acted upon by the organs of absorption, which may be situated in the alveoli, or in the cavities of the fangs, without being actually in the substance of the bone of the tooth.]

GEN. I.
SPEC. II.

O. Dolorosa.
Explanation of the cause of the imbedded state of bullets sometimes found in elephants' tusks.

Absorption of fangs no proof of vascularity of the teeth.

SPECIES III. Odontia Stuporis.—*Tooth-edge.*

Tingling uneasiness of the Teeth from grating sounds or frictions.

THERE is sometimes a peculiar sensibility in the teeth or their sheaths that induces a kind of vibratory pain, in which they are colloquially said to be SET ON EDGE; and that in two ways, as follows:

α A stridore.

From jarring noises.

β Ab acritudine.

From vellicative or acrid substances. \

In many cases the teeth sympathize with the ear, on an exposure to harsh, dissonant, or stridulous sounds, as the grating of a file, the creaking of a door on its hinges, or of a swinging sign in the street.

The same effect is produced whenever the teeth are velligated by smooth substances, as a piece of silk or velvet, or exasperated by acid or other acrid materials.

To explain these effects, it is necessary to observe, in the

α O. Stuporis à stridore.
From jarring sounds.
β O. Stuporis ab acritudine.
From vellicative or acrid substances.

* Manuel d'Anat. tom. iii. p. 357. See also Mém. sur l'accroissement continué et la reproduction des Dents chez les lapins, &c. par M. Oudet, in Magendie's Journ. de Physiol. tom. iii. et iv.

† See Rees' Cyclopædia, art. CRANIUM.

GEN. I.
SPEC. III.
O. Stuporis.
Tooth-edge.

Cause ex-
plained.

first place, that a close reciprocity of feeling is at all times maintained between the teeth and the tympanum of the ear, by an union of their respective nerves; as one of the branches of the seventh pair, destined to supply the tympanum, anastomoses with the lingual branch of the fifth, which sends offsets to the teeth: by which means the latter become indirectly an organ of sounds as well as of mastication. It is for this reason, among others, that deaf persons open their mouths to catch up speech they cannot otherwise hear; and that, as already observed, in cutting the wise or adult teeth, the tympanum not unfrequently endures more pain than the gum or membrane by which the tooth is covered; and hence, the tuner of a musical instrument is often in the habit of applying his tuning pipe to his teeth, as soon as he has put it into a state of vibration, to determine the more accurately upon its pitch.

Now, as the last action is a source of pleasure to the teeth, from the vibrating tone proving agreeable to the ear, we can readily see why tones or sounds of any kind that are hateful to the ear should be hateful also to the teeth.

This is the general principle: and it is sufficient to explain why all persons are in a certain degree subject to the tooth-edge upon an exposure to the more common causes that produce it. But, in constitutions of a peculiar kind, or where the ordinary association between the two organs has been specially and habitually cultivated, or some early and very powerful impression has been even accidentally communicated from the one to the other, the sensation of tooth-edge will be produced far more frequently and acutely than in other cases. And when in such persons the teeth are in a state of preternatural sensibility from any kind of diseased action, or from irritating substances applied to them and the gums, as acerb or acid juices, the sensation may become so acute as to be intolerable. Bartholine has recorded a case, in which the sharpening of a knife so highly excited not the teeth only, but the surrounding gum, that, along with a very sensible jarring of the teeth, a profuse hemorrhage from the gum was occasioned.*

Case ac-
companied
with hemor-
rhage.

Sometimes
produced
by imagina-
tion.

In many instances, the power of the imagination alone; from a long habit of association, is sufficient to call up a very considerable degree of this painful feeling;† as when we see a knife drawn across a china-plate, though so gently as to produce no sound whatever; and there are instances of persons in a high degree of excitement, who, by this action alone, have been suddenly thrown into convulsions.

Mode of
treatment.

Where this affection is permanent, or very frequent and troublesome, and proceeds from a morbid state of the teeth or their involucres, our attention must be particularly directed to the nature of the cause with a view to its removal: if the gums be inflamed, spongy, or otherwise irritable, scarification will often be found serviceable: and if the disease be seated in the body of the teeth, several of the remedies recommended under

* Epist. IV. p. 523.

† Darwin, Zoonom. sect. xvi. 10. and class iv. 1, 2, 3.

the preceding species may have an equally good effect in the present case. If it be a symptom of some other complaint, it can only be removed by a removal of the original disorder. Forestus,* Baricelli,† and other writers, assert that relief may often be obtained by chewing purslane leaves. When it is the mere result of an association of ideas, or of great strength of sympathy, with an ear delicately alive to harmony of sounds, it is best cured by an habitual exposure to the cause of the affection, which gradually blunts the feeling. The grating sound, produced by filing a saw, was probably at one time harsh and abhorrent to the ears of the sawyer; but, by being inured to it, he at length hears it with indifference.

GEN. I.
SPEC. III.
O. Stuporis!
Tooth-edge.

SPECIES IV. Odontia Deformis.—*Deformity of the Teeth.*

Teeth irregular in shape, position, or number.

DEFORMITIES of the teeth are for the most part produced naturally and in early life. Either set may be too large or too small, or some of them much larger or smaller than the rest, or they may be irregular in their line of ascent. They may be misplaced by incurvation, or procurvation, or obliquity. They may be crowded and confused, or, as has sometimes occurred, be multiplied in crops of double or triple rows.‡ In all which cases they cannot too soon become a subject of artificial arrangement, which in young persons may accomplish much, and often, by skilful management, not only correct the error of shape or number, but give a proper inclination, not merely to the teeth, as they start from their natural line, but even to the misshapen sockets.

How produced.

Many of these irregularities proceed from a natural excess or deficiency of the calcareous matter which enters into the structure of the teeth. This has been sometimes so defective as to leave the teeth cartilaginous, or possessed of their animal part alone: and in a few cases, as I have already observed, to retard the appearance of even the first or shedding set till ten or twelve years of age. [Plenck extracted from a girl, seven years of age, a canine milk-tooth of the lower jaw, which was livid, as soft as cartilage, and compressible by the fingers, especially at the fang.§ This case was no doubt a specimen of imperfect original development.] But the opposite extreme is by far the most frequent; and where this exists in a considerable degree, we not only find occasionally all the irregularities already noticed as resulting from plurality, but sometimes a direct symphysis,|| or inseparable union between the teeth and their sockets, so that it is impossible to extract them in the case of tooth-ache or any other malady without fracturing the socket: sometimes a perfect continuity or coalition between all the teeth,* insomuch

Calcareous matter often excessive or deficient.

* Lib. xiv. Obs. 9.

† Hortus Genialis, p. 337.

‡ Bloch, Medicinische Bemerkungen, p. 19. For others, see Nosolog. in loc.

§ De Morb. Dentium, p. 39.

|| Courtois, Dentiste Observateur.

GEN. I.
SPEC. IV.
O. Deform-
is.
Deformity
of the teeth.

Inaccordant
action of the
first and
second set.

Second set
wider than
the first.

that in one instance the whole was found to constitute a single bone or curb of ivory.† Then again, we sometimes meet with a production of teeth in other parts of the mouth than the gums, and particularly in the palate, of which examples are to be found in Schenck‡ and Borelli,§ as well as in several of the continental journals. Albinus records an instance, in which a tooth grew out of the maxillary process below the orbit.||

Another cause of irregularity in the ascent of the permanent teeth is an inaccordance of time or manner in the absorption of the fangs of the first set of teeth, and the protrusion of those of the second set. As the latter fangs are thrown forth, the former, in all cases of regularity, are carried away: and hence the permanent teeth, pressed forward by the gradual prolongation of their fangs, bear before them the mere crowns of the shedding-teeth, and find little resistance to their ascent. [In the last edition, the author refers to these circumstances in proof of the vascularity of the teeth, observing that, as the fangs pullulate from the bodies of the teeth, the latter parts must have vessels. The truth is, however, that the fangs are formed from the vessels of the prolongations of the pulp.] Now, if the fangs of the upper set be not sufficiently carried off, or, in other words, the crown of the teeth be not sufficiently detached and set at liberty, as the under set, or any particular teeth in the under set, press forward, the latter must necessarily be thrown out of their proper line, and rise within, or without, or wherever they can force their way.

The second set of teeth is also wider than the first; and hence, with the exception of the bicuspidati, which from this very circumstance rise under the shedding molares, every single tooth in its ascent must be opposed to more than a single tooth above it; whence another source of difficulty and often of irregularity. In consequence of all which, it is rather to be wondered at, that we do not meet with more frequent instances of deranged or misshapen teeth than actually occur to us. And nothing can be clearer, than the necessity of a close and skilful watch over them during the shedding season, so as to remove any of the first set when they form an undue degree of resistance to the permanent, and have a tendency to throw them out of their proper line; and any of the second set that may exceed their proper number, and, by their surplus, crowd and misplace the rest.

SPECIES V. Odontia Edentula.—*Toothlessness.*

Loss or want of Teeth.

THIS is also a very common affection, and offers the following varieties:

* Bartholin. Hist. Anat. Sent. i. hist. 35. Henckel, Sammlung Med. und Chir. Ammerkungen, vii. N. 16. † Schenck, lib. i. Obs. 412.
‡ Id. Obs. 411. § Cent. ii. Obs. 81. || Annot. Acad. tom. i. p. 54.

| | |
|--------------------|-----------------------------|
| α Peculiaris. | From constitutional defect. |
| β A vi extrinseca. | From external violence. |
| γ A carie. | From decay. |
| δ Senilium. | From old age. |

GEN. I.
SPEC. V.

As the teeth are often produced supernumerously, so are they often naturally deficient in number. [The dentes sapientiæ, which are the last cut, are those which are most frequently not produced at all; however, there is hardly any particular tooth that has not sometimes failed in its development.] This is sometimes the case with the biscuspidati, as it is not uncommon to meet with a person in whom one, two, or more of these have never made their appearance. But it occurs more frequently in the incisors, particularly of the lower jaw: and Mr. Fox refers to an instance in which this defect appertained to several individuals of the same family, none of whom had ever cut these incisors. [In one example on record there were only four permanent teeth in each jaw. Another person had but a single incisor in the upper jaw; and cases have been met with in which all the teeth were wanting.*]

But the other varieties of cause are more obvious and common: being

Violence, by which they are suddenly misplaced, or knocked out;

Caries, or inflammation of the surrounding sheaths, by which they become loosened in their sockets; and

The natural absorption of their sockets in advanced life.

In many instances, therefore, the separated teeth are in a sound state; and, in a few instances, where the alveolus is also perfect, and the tooth has only been out of it for an hour or two, so that its living principle has not altogether ceased, it may be replaced, and will take a fresh hold and become serviceable for many years; though it rarely, perhaps never, forms so firm and permanent an attachment as before the accident which threw it out.

Mr. Hunter extended this mode of supply to a transplantation of teeth from other persons: and at one time this method also was carried to a considerable extent of practice. Too much caution, however, cannot be employed in ascertaining the health of the individual by whom the scion-tooth is to be furnished: for syphilis, and other diseases, may be transplanted at the same time. As an instructive case upon this subject, I may refer to the following, drawn up by Dr. Watson, and inserted in the Medical Transactions.† An incisor tooth of the upper jaw, from an unknown cause, becoming carious in a young unmarried lady about twenty-one years of age, it was extracted, and the place very dexterously supplied by a like tooth from another young woman, who, upon examination for the purpose, appeared to be in good health. The scion-tooth very rapidly took a firm hold, and soon bid fair to be of great service and ornament. In about a month, however, the mouth became pain-

α O. Edentula Peculiaris.
From constitutional defect.

β O. Edentula a vi extrinseca.
From external violence.
γ O. Edentula a carie.
From decay.
δ O. Edentula Senilium.
From old age.

Hence separated teeth often sound.

Transplantation of teeth.

Danger of, elucidated.

* Fox on the Teeth. Sabatier, Anat. tom. i. p. 78.

† Vol. iii. art. xx.

GEN. I.
SPEC. V.
O. Eden-
tula.
Toothless-
ness.

ful, the gums inflamed, discoloured, and ulcerated. The ulceration spread very fast, the gums of the upper jaw were corroded, and the alveoli left bare. Before the end of another month, the ulceration stretched outwardly under the upper lip and nose, and inwardly to the cheeks and throat, which were corroded by large, deep, and fetid sores. The alveoli soon became carious, several of the teeth gradually dropped out, and at length the transplanted tooth, which had hitherto remained firm in its place.

About this time blotches appeared in the face, neck, and various parts of the body, several of which became painful and extensive ulcers; a considerable degree of fever, apparently hectic, was excited; a copious and fetid discharge flowed from the mouth and throat, which impeded sleep, and the soreness of the fauces prevented a sufficiency of nourishment from being swallowed.

The wisest plan would probably have been to have commenced from the first with a mercurial process, before the system was so far debilitated, and the general health so deeply encroached upon as to render any plan of very little use. An antiseptic course, however, of bark and other tonics was first tried and persevered in till found to be of no service whatever; and calomel pills in an alterative proportion were then had recourse to in their stead. This plan was found to soften every symptom, and totally to eradicate many: but the bowels were soon affected with severe pain and purging; and the calomel was exchanged for strong mercurial ointment; which, from the present debility of the patient, soon produced a like effect, and an effect that could not be corrected by opium; and, in the end, the patient fell a victim to the experiment. The person from whom the tooth had been taken, had in the mean time continued in perfect health; and upon a minute inspection, as well of the sexual organs as of the mouth, evinced not the slightest syphilitic affection.

The case is mysterious, and leaves much ground for the imagination to work upon. If it be difficult to conceive it to have been syphilitic, it is more difficult to conceive it to have been any thing else. But the grand lesson to be learnt from it on the present occasion, is that of the wariest caution, and a caution amounting almost to a prohibition, in remedying a deficiency of teeth by transplantation.

Such evils
how ac-
counted for
by Mr. J.
Hunter.

Other cases might be advanced, but it is unnecessary. Mr. Hunter, partial to his own invention, endeavoured to account for most of these upon the principle of local irritation exciting remote evils, or universal sympathy. Yet the cases of mischief have been so severe and numerous, that the practice has long fallen into great disrepute, and is now seldom ventured upon.

Mere
crowns of
sound teeth
may be
safely
transferred.

A transfer, however, of the mere crowns or bodies of sound teeth, with the fangs filed off, does not seem to have been productive of the same evil effects; and hence these may be conveniently made use of when the body of one or more teeth has been destroyed by caries; while the fangs have remained sound;

for by screwing a piece of gold wire into the crown of the scion-tooth, and boring a hole into the fang of the lost tooth, the former may be made to take a firm hold without any attachment to the adjoining teeth; and, if due care be taken in the selection, it will make the best match, and produce the most perfect supply, that human art can bestow.

When natural teeth are not employed, the dentist has recourse to artificial teeth, commonly obtained from the tusk of the hippopotamus; though, in order to confer a greater durability, they have of late years been ingeniously formed of a composition of porcelain earth properly modelled and burnt.

GEN. I.
SPEC. V.
O. Edentula.
Toothlessness.

SPECIES VI. Odontia Incrustans.—*Tartar of the Teeth.*

The Teeth incrustrated with extraneous matter.

THE teeth are always subject to be covered over with layers of an earthy material, secreted as a constituent part of the saliva, and denominated tartar.

Simple as this substance seems to be, no very clear explanation either of its origin or character has hitherto been given. According to Professor Berzelius, tartar, when it first settles on the teeth, is mere hardened mucus: "but during the destruction of the mucus," says he, "we insensibly trace phosphate of lime on the enamel of the tooth, which is sometimes increased to a crust of the thickness of from a fourth to the half of a line: and in this state it contains, besides the phosphate, about a fifth part of its weight of mucus which has been exsiccated in the earthy mass."*

Chemical principles of the tartar.

Tartar of the teeth, therefore, as far as it has been analysed, consists of concrete or dried saliva, hardened by its own earthy materials. As it flows from the salivary ducts, it is always found most accumulated around those teeth which are situated nearest to their openings. M. Serres, indeed, has ventured to assert that this material is secreted by a set of minute and distinct glands, of which he has given an engraving, and then gravely affirms, "*ce tartre n'est donc pas un produit de salive.*"† But till some other anatomist besides himself has met with the same glandular structure, it is by no means worth while to relinquish the established belief. In some persons, however, the saliva is much more loaded with earthy materials than in others; for while some have very little trouble in keeping their teeth free from this deposit, in others it forms so copiously, that nothing but an unremitted attention will preserve their teeth from being covered with it.

Whether formed from the saliva.

Varies in the quantity secreted.

While this material continues soft, it has a yellowish appearance; but as it hardens, it changes to a dark brown or a black; and often, in children, to a dark green. By degrees the teeth lose all their beauty to the eye, the gums are detached from their respective necks, are irritated and inflamed; the alveolar

Progress of the disease.

* Animal Chemistry, p. 62.
Dents. Paris, 1817.

† Essai sur l'Anatomie et la Physiologie des

GEN. I.
SPEC. VI.
Odontia In-
crustans.
Tartar of
the teeth.

processes of the teeth are exposed, absorbtion takes place, and the teeth become loosened: while the breath is loaded with a disagreeable fetor, from the decomposition of such a mass of animal matter: In some cases, the accumulation has been so enormous as to be half an inch in thickness both on the outside and inside of the teeth,* or to cover the whole range of teeth, and unite them into a solid heap.†

How pre-
vented by
habitual
attention.

It is almost superfluous to point out the necessity of attention to prevent so foul a disfigurement. The daily use of a tooth-brush with any of the ordinary tooth-powders will, however, in most cases be sufficient for this purpose. The basis of these powders is of little importance, provided they contain nothing that may injure the enamel. Pulverised fish-shells, cuttle-fish-bone, boles, bark, myrrh, mastic, soot, and charcoal, may be used with equal advantage, according to the fancy; and when an odour is wished for, it may be obtained from ambergris or orris-root. It is only necessary to observe, that the powder be innocent in its quality, and impalpable in its reduction.

Milder
acids may
be employ-
ed.

If the tartar yield not to these, we may, without mischief, add a small quantity of some of the milder acids in order to render it more efficacious. All dentists oppose the use of acids of every kind; but this is from an inacquaintance with the gradation of chemical affinities. I have already observed, that there are but four known acids for which the lime of the teeth has a stronger attraction than for the phosphoric with which it is combined; and these four are, the oxalic, sulphuric, tartaric, and succinic. From these, therefore, we ought sedulously to abstain; but most of the rest may be used very harmlessly, and will often be found, by the friction of a tooth-brush, to dissolve the tartar of the teeth without making the least impression upon their substance.

Scaling.

But if the deposit still bid defiance to our exertions, it must be removed by the operation of scaling; and the gums afterwards be washed with some pleasant astringent lotion.

Accumula-
tion, how
prevented
in India.

In India the accumulation of tartar is prevented by an application named *miscæe*, which produces indeed a black jet upon the teeth, but leaves the enamel untouched, while it destroys the tartar and hardens the gums. Its ingredients are not known.

SPECIES VII. Odontia Excrescens.—*Excrecent Gums.*

The substance of the surrounding gums excrecent.

Not only by the concrete deposit, called tartar, are the teeth occasionally incrustated and buried, but sometimes by a prurient growth of the substance of their own gums, which from different circumstances appears under the two following forms:

α Spongiosa.

Fungous or spongy gums.

Scurvy of the gums.

β Extuberans.

With distinct extuberances
on the surface.

Extuberant gums.

* Berdmore, p. 56. † Eustachius, Tract. de Dentibus, cap. xxix. Stö-
eler Beobachtungen, &c. N. 3.

The gums sometimes assume a soft fungous or spongy appearance: and this too, as Mr. Hunter has observed in persons who are in all other respects perfectly well:* and this case, though vulgarly called a scurvy of the gums, is distinctly an idiopathic affection. It may however be symptomatic of dyspepsy or some other disorder of the stomach, or some equally remote organ; or the result of a morbid state of the alveoli, or teeth themselves; and, unquestionably, it may appear as a symptom of porphyra, or real scurvy, affecting the system generally.

GEN. I.
SPEC. VII.
α O. Excre-
scens spon-
giosa.
Scurvy of
the gums.

If the craggy stump of a tooth be the source of irritation, it will be in vain to attempt a cure till the relic of the tooth be removed: and if the socket be in fault, it will be necessary to expose and examine it. But in all cases in which the disease originates in the gums, and depends upon a lax state of their texture, scarification, freely and repeatedly made use of, will be the best, and, in many instances, the only remedy. It disgorges the overloaded vessels, and leads both to immediate ease and a radical cure. I have frequently found it necessary to follow up the scarification into the roof of the mouth, which often partakes of the irritation, and is puckered into wrinkles of exquisite tenderness, that cannot endure the slightest touch. After scarification, the gums and month should be washed with some warm and resinous tincture, as that of bark and myrrh; and be gradually accustomed to the friction of a tooth-brush, and some astringent tooth-powder, in the choice of which the patient may be allowed to please his own fancy; though perhaps the best are those prepared from several of the more astringent funguses, and especially the *cynomorion coccineum* of Linnéus, better known by the name of *fungus Mellitensis*. And if this plan be not sufficiently stimulant, it will be necessary to wash the mouth and gums with a very dilute solution of nitrate of silver; or to apply it with a pencil-brush to the gums alone in a much stronger state. Dr. Paris recommends as a dentifrice equal parts of powdered catechu and bark, with one-fourth the quantity of powdered myrrh.†

Scarification
the best
remedy.

Astringent
applications.

The extuberant excrescence, which forms our second variety, is sometimes firm and unyielding, rising into distinct and hardened knobs instead of assuming the appearance of soft and spongy germinations. In these cases, the general texture and consistence is that of the gums themselves: and the only radical cure consists in extirpating them with the knife, a ligature, or caustic. Even after extirpation, they are very liable to grow again, and with great obstinacy and perseverance. Mr. Hunter mentions a case in which they were reproduced six times, as he suspected, from a cancerous disposition. They are also, in general, very largely supplied with blood-vessels of considerable magnitude, which often produce a troublesome hemorrhage after the operation. [Hence, a ligature, or caustic, has sometimes been preferred as a means of extirpation.

β O. Excre-
scens extu-
berans.
Firm extu-
berances of
the gums.

* Diseases of the Teeth, ch. iii.

† Pharmacol. vol. ii. p. 131. 5th edit. 1823.

GEN. I. When the knife is used, it is often necessary after the operation
SPEC. VII. to use the actual cautery for the suppression of the bleeding; for, as Mr. Hunter observes, arteries, going to increased parts, are themselves increased, and, becoming diseased, have not the contractile power of a sound artery.*

Excrescences from the gums sometimes have so cancerous an appearance, that surgeons are fearful of meddling with them. Here a remark, made by Mr. Hunter, is extremely valuable to the practitioner; namely, that when the swellings arise at once from the gum, which appears to be the only diseased part, they have no malignant disposition. When, however, there is strong evidence of a tumour having originated deeply in the alveoli, the teeth, perfect as they may be in appearance, must be sacrificed, as well as the alveolar process itself. The worst diseases of the gums, as Mr. C. Bell has remarked, do not proceed from the irritation of bad teeth. We frequently see, indeed, a carious tooth attended with ulcer and gumboil, abscess of the jaw, fungous tumour of the gums, and even necrosis of the bone. We find the pain of the inflammation equal to that of *tic douloureux*; but the case is not to be compared, in point of danger, with the tumour, which has a deeper source, and is frequently seen growing up beneath sound teeth. The hemorrhage that follows may generally be stopped with a dossil of lint, dipped in muriated tincture of iron, and pressed into the bottom of the wound.†

There cannot be a doubt that many cases on record, which are described as malignant diseases of the gums, and as having proved fatal, by extending themselves up to the base of the brain, were, in fact, fungous diseases of the antrum.‡]

GENUS II. PTYALISMUS.—PTYALISM.

Involuntary flow of Saliva from the Mouth.

Analysis of
saliva.

THE saliva issues from three distinct sets of glands distributed over different parts of the mouth, as the parotid, the submaxillary, and the sublingual; [and, according to Berzelius, a quantity of it equal to 1000, consists of water 992·9; a peculiar animal matter 2·9; mucus 1·4; alkaline muriates 1·7; lactate of soda and animal matter 0·9; pure soda 0·2·§ What Berzelius sets down as mucus, is considered by professor Thomson and Dr. Bostock to be albumen. This is insoluble in water, and, when incinerated, affords a large portion of phosphate of lime. The tartar of the teeth is derived from its gradual decomposition upon them. The recent investigations of Tiede-

* See Natural Hist. of the Teeth, p. 170. 3d edit.

† See C. Bell's Surgical Obs. vol. i. p. 413, &c. and Gibson's Institutes of Surgery, vol. ii. p. 323.

‡ For examples of the fatal ravages of some diseases of the gums, consult J. Bell's Principles of Surgery, vol. iii.; C. Bell's Quarterly Report, vol. i.; Hill, in Edinb. Med. and Surg. Journ. No. 61; and Gibson, in Philadelphia Journal, vol. ii. § See Med. Chir. Trans. vol. iii. p. 242.

mann and Gmelin, however, to which reference has been made in the physiological proem, prove saliva to be a more compound fluid than was formerly supposed; and one of their principal discoveries is, that the sulpho-cyanic acid, a most active poison, combined with potass, enters into its composition. Its solid contents are found to be $\frac{1}{23}$ per cent. The quantity of saliva secreted daily is considerable. Nuck and Lanzoni estimated it at a pound in twelve hours; Mr. Cruickshank at a pound in twenty-four hours; but it must vary according to circumstances. The secretion is more copious in children and old persons than in adults; in cold than in warm climates; in the day than the night. The smell or sight of any agreeable food makes the saliva flow into the mouth with considerable rapidity. The same effect results from the irritation of smoking tobacco; and from that of bitter, sour, or salt substances in the mouth. The habit of frequently ejecting spittle from the mouth renders an augmented secretion of it necessary. A person's talking much has a similar consequence; and so large is the quantity of saliva secreted during meals, that Sabatier saw a soldier, who, at these periods, used to wet several towels with what was discharged from a fistula communicating with the parotid duct.* In disease, the quantity of saliva is sometimes increased, sometimes almost suppressed. Its office is twofold: that of moistening the mouth in combination with a small portion of mucus secreted by the labial and buccal glands, and that of contributing to the digestion of the food in the stomach and duodenum.

GEN. II.
Ptyalismus.
Ptyalism.

Under the influence of the irritating passions, and especially of violent rage, it assumes a frothy appearance, and in many animals becomes poisonous. It is said, indeed, to become so sometimes in man himself.†

How excited.

When the saliva is secreted in a healthy proportion, and the various muscles of the mouth perform their proper office, it is never discharged from the mouth, unless voluntarily; but passes readily from the fauces into the œsophagus. But it may be secreted immoderately, or the muscles of deglutition may not properly perform their functions: and, in either case, the saliva will flow from the mouth involuntarily, accompanied with a specific difference of symptoms. And hence ptyalism, as a genus, offers the two following species of disease. [Another species was enumerated in the last edition, under the name of ptyalismus chronicus; but, as the remarks upon it were not important, and the reality of the case is questionable, the editor has now omitted it.]

Immoderately secreted in various ways,

1. PTYALISMUS ACUTUS.

SALIVATION.

2. ————— INERS.

DRIVELLING.

* Traité d'Anat. tom. ii. p. 171.

† Hoffman, Diss. de Salivâ ejusque Morbis, p. 24.

GEN. II.
SPEC. I.

SPECIES I. Ptyalismus Acutus.—Salivation.

Ptyalismus
acutus.

Increased secretion of Saliva from an Increased Action of the Salivary Glands.

Sometimes
symptom-
atic.

AN increased action of the salivary glands, productive of salivation, occurs not unfrequently as a symptom of some other disorder; and a symptom that in many cases proves highly salutary and even critical: as in fevers of various kinds, exanthems, of which Dr. Perceval of Dublin writes me word he has had instances in miliaria with transparent vesicles, in jaundice, and dropsy; instances of which are given in the author's Nosology. It often takes place also in suppressed discharges of various kinds, as those of menstruation, perspiration, and urine, and is occasionally found a useful substitute. But as in all these cases it is a mere concomitant or dependant affection, we must defer our consideration of it in these relations, till we come to the diseases themselves of which it is a symptom or sequel.

Produced
by siala-
gogues;

The salivary glands are directly excited to an increased action by stimulants, or sialagogues, as they are called, of various kinds. There are numerous plants endowed with this power, which in their roots, bark, or leaves, contain a warm, acrid juice: as tobacco, mezereon, pyrethrum, or pellitory of Spain; *pimpinella saxifraga*, or smaller burnet saxifrage; *imperatoria*, or masterwort. Simple mechanical pressure, produced by the manducation of any hard substance, as when we eat a dry biscuit, is also a stimulant of the same kind: far less active indeed, but highly useful in its effect, as tending to resolve the substance to which the pressure is applied. Dentition is a common cause at whatever time the teeth be produced. Even the mechanical irritation of another organ, with which the salivary glands are closely connected by continuity or sympathy, will often lead to a like effect. Mr. Powell has given an interesting instance of this in vol. ii. of the Medical Trans. of the College. A piece of wool, accustomed to be worn in the ear, had imperceptibly slid into the meatus auditorius, and for upwards of two years stimulated the organ without being suspected; during the whole of which period the patient discharged from a pint to a pint and a half of saliva daily. The ear itself at this time became painful, and was examined; the piece of wool was detected, and extracted in a very offensive state; and the salivation in a short time entirely subsided. In like manner it is a frequent accompaniment of pregnancy; as it is occasionally of some other irritation of the stomach or intestinal canal; in which last case it frequently betrays its source by a saccharine taste. [In some cases the cause is obscure. The editor knows a gentleman, who had several annual and tedious attacks of a very debilitating ptyalism, the reason of which was by no means apparent from any particularity in the previous state of his health, or in his regimen; and M. Ribes mentions a porter at the hospital for invalid soldiers at Paris, who was continually annoyed for six weeks with a salivation, that used to increase in such a degree at night, that the flow of saliva from the mouth might have been com-

by mechani-
cal press-
ure;

by remote
mechanical
irritation.

Cause
sometimes
obscure.

pared to a shower of very clear water.* No cause was assigned for the complaint.]

Generally speaking, however, though not always, an increased flow of saliva from any of the above causes is of such short duration, and so easily removed when troublesome, that it is rarely the subject of medical attention; and the only varieties to which it gives rise, that are particularly worthy of notice, are the following :

- | | |
|-----------------------|----------------------------------|
| α Hydrargyratus. | Produced by the use of mercury |
| Mercurial salivation. | or its preparations. |
| β Sensitivus. | Produced by the sight, smell, or |
| Mouth-watering. | thought of agreeable food. |
| γ Mellitus. | Accompanied with a sweet or |
| Sweet-spittle. | mucilaginous taste. |

Quicksilver, in whatever mode introduced into the system, whether by the skin, the stomach, or the lungs, uniformly stimulates the salivary glands, and produces an increased flow of saliva : and is almost, if not altogether, the only substance we know of, which, introduced internally, universally acts in this manner. Nitric and other acids have been suspected to produce a like operation.

[The author of this work and Dr. Paris, however, both consider the opinion groundless.† Yet, according to the evidence of Dr. Scott, if the nitro-muriatic acid lotion, or bath, be employed to a certain extent, tenderness in the palate and mouth, and ptyalism, are sometimes produced; but without any offensive smell of the breath, or loosening of the teeth, as from mercury. He states, that these effects were excited in himself and others, and that he has seen as violent a salivation thus raised, as he has ever noticed from mercury.‡]

Antimony has also been thought by a few practitioners to have some such influence upon the salivary glands. “Dr. James lately informed me,” says Sir George Baker,§ “that for sixteen years past his fever-powder has contained no mercury; and yet, that within that space of time he has known at least six instances of a salivation raised by his medicine. He added, that the patients who were thus salivated had neither their teeth loosened nor their breath made offensive, as happens in a mercurial ptyalism.” Fusch tells us, that he has occasionally observed a like effect;|| as does Willich, when tartarized antimony has been employed.¶ [According to Dr. Paris, the latter medicine in nauseating doses certainly promotes a salivation by mercury; and so does the accidental supervention of any disease of debility.** The editor, in his practice amongst the prisoners of the King’s Bench and Fleet prisons, has seen four or five cases, in which redness and swelling of the gums, and

GEN. II.
SPEC. I.

Ptyalismus
acutus.
Salivation.

α P. hy-
drargyratus.
Mercurial
salivation.

Salivation
produced by
mercury,
however in-
troduced
into the
system.

The only
medicine
that thus
acts.

* See Dict. des Sciences Méd. tom. xlix. p. 459. † Pharmacologia, vol. i. p. 202, 6th edit. ‡ See Med. Chir. Trans. vol. viii. p. 183, and Beddoes’s Contributions, p. 430. § Medical Transactions of the College, vol. i. p. 378. || Dissert. de Antochiria. Jen. 1681. ¶ Baldinger, N. Magazin, band viii. p. 252. ** Pharmacologia, vol. i. p. 233, 6th edit.

GEN. II.
SPEC. I.
α P. hy-
dragyratus.

Effects of
mercury on
miners.

Effects on
manufac-
turers.

Singular
effect on
board the
Triumph.

Different
effects on
different
constitu-
tions.

Mercurial
salivation.

salivation, proceeded from the free use of the compound squill pill. A similar fact is recorded by Quarim.*]

From the general tendency of mercury to produce this specific effect, those who are engaged in working quicksilver mines, as those of Idria or New Spain, are almost continually in a state of salivation; and when, which is often the case, condemned as criminals to such labour for life, drag on a miserable existence, in extreme debility and emaciation, with stiff incurvated limbs, total loss of teeth, and equal loss of appetite, till death in a few years, with a friendly stroke, puts a period to their sufferings.

From the facility with which quicksilver evaporates, and combines, not only with other metals, but with almost all other substances, and especially with many of the elastic gases, a considerable degree of injury is often sustained by workmen in manufactories in which quicksilver is occasionally employed, without their being for a long time aware of the cause. An instance of a similar kind occurred not long ago on board the Triumph man-of-war, which had received on board thirty tons of quicksilver contained in leathern bags of fifty pounds each, that had been picked up on the shore at Cadiz from the wreck of two Spanish line-of-battle ships, that had been lost during a storm in March 1810. The bags were stowed in the hold, and other low parts of the ship; but being saturated with sea water, they soon decayed, and burst. The quicksilver thus let loose was collected as well as it could be, and committed to proper casks: but much of it escaped into the recesses of the ship; and not a little was secreted by the sailors, who amused themselves with it in various ways. The quicksilver that had escaped unnoticed sunk into the bilge-water, became partially decomposed, and ascending soon after, amidst an intolerable stench, with the vapour of the water, coated every metallic substance in the ship with a black hue; and at the same time a general affection of the mouth took place among the men and officers, to such an extent, that no less than two hundred became severely salivated, and did not recover till the ship, being carried into Gibraltar, was docked and cleaned to its lowest planks.

Mercury, however, produces very different degrees of effect upon different constitutions or states of the body. In a few rare instances, it has exerted no sensible influence whatever upon the excretories of the fauces: in others, a very small quantity of almost any of its preparations has stimulated them at once to a copious discharge.

In persons of a highly nervous or irritable temperament, I have known salivation produced by a single dose of calomel; and that it is sometimes caused by dressing ulcers with red precipitate, is a fact mentioned by Hildanus, and well known to all experienced surgeons. In scorbutic, scrofulous, and other debilitated habits, very small quantities of mercury will sometimes act in the same manner; and hence a considerable degree of

* Animadversiones Pract. Viennæ, 1786.

caution is requisite in all cases of this kind. Even the wearing of a leathern girdle, or the occasional application of white precipitate or mercurial ointment to the head to destroy vermin, has often excited salivation. GEN. II.
SPEC. I.
α P. hy-
dargyratus.

When mercurial salivation is produced, it is accompanied with a high degree of irritation, not only of the mouth and fauces, but of the system generally. The common course of symptoms is as follows: the mouth feels unusually hot, and is sensible of a coppery or metallic taste; the lingual and sublingual glands swell; apthous vesicles appear, and terminate in minute and offensive exulcerations; the tongue tumefies; the throat becomes sore; pyrexia and sleeplessness supervene, and are, indeed, often present from an early period of the disease: while in idiosyncrasies, or habits of great irritability, we frequently find the surface of the body wholly, or in particular parts, reddened with a peculiar erythematic inflammation, continuous or in patches, to which the name of hydrargyria has been given by some writers, and that of *erythema mercuriale* by others. [Gangrene and necrosis may be the consequences of immoderate mercurial salivation. Large sloughs of the parts in the mouth are very common. Cullerier has seen a partial necrosis of the lower jaw produced in this manner, and, in one young woman, a complete necrosis of the upper and lower alveolar arches.* The editor of this work has witnessed several melancholy examples of the same kind.] Local
symptoms
of saliva-
tion.

Hydrargy-
ria.

It is difficult to determine by what means mercury produces its effect on the salivary glands. Dr. Cullen attempted one explanation of the subject; namely, that "mercury has a particular disposition to unite with ammoniacal salts, and that such salts are disposed to pass off by the salivary glands more copiously than by any other excretion." But as Dr. Murray has remarked, mercury has not any peculiar tendency of this kind. Indeed, if it had, no ammoniacal salts are mentioned, either by Berzelius, or by Tiedemann and Gmelin, as entering into the composition of the saliva. Dr. Cullen regards mercury as nothing more than a general irritant, operating equally upon all the sensible and moving fibres of the body, and hence powerfully operating upon all the excretories of the system, without having a special affinity to one set more than to another. "It proves often," says he, "diuretic; and I have particular proofs of its reaching and acting upon the organs of perspiration."† Another hypothesis is that of Sir Gilbert Blane,‡ who considers the salivary glands as one of the outlets for the ramenta of the bones, because lime is detected in the saliva, and even concretes on the teeth. Now, as mercury is known to produce an active absorption of the solids, it is ingeniously conceived that the fact in some measure explains its effect upon the salivary glands. However, as the kidneys and other excretory glands also furnish outlets for the old particles of the body, and yet Difficulty of
accounting
for it.
Cullen's ex-
planation.

* Dict. des Sciences Méd. tom. xlix. p. 455. † Mat. Med. vol. ii. p. 443.

‡ Trans. for the Improvement of Med. Knowledge, vol. iii. p. 112.

GEN. II. are not affected by mercury in the same degree as the salivary glands, this theory cannot be retained.* The fact, however, remains the same; namely, that mercury, whether it possess a specific affinity or not for the excretories of the saliva, acts, from some cause or other, more readily and powerfully upon them than upon any other excretories whatever.

SPEC. I.
α P. hy-
drargyratus.
Medical
treatment. In attempting a cure of salivation from mercury, our attention is to be directed to the local state of the fauces and the general state of the system.

Gargles and
purgatives. If the throat be not much inflamed, acidulous gargles and acerb fruits, as the sloe, may be employed with great advantage, and should be used freely; but if there be considerable irritation, we must at first content ourselves with emollient gargles of barley-water or quince-seeds: and in either case employ, at the same time, purgatives of Epsom or other neutral salts.

Opium and
sulphur. When the system is much affected, sulphur and opium have been strongly recommended, and seem in many cases to have been successful. The former is trusted to, chiefly from its being well known to diminish the activity of mercury out of the body;—a doubtful reason, however, for our employing it internally. The latter is certainly of considerable use in allaying the general restlessness and irritation of the system.

Pure air
and mild
diluents. Pure air and a milk diet are highly serviceable; but, perhaps, there is no disease in which the Lisbon diet-drink, or compound decoction of sarsaparilla, may be used with better effect. Taken in the quantity of a quart a day, it carries off the effects of the poison, and supports the system.

Emetics. [Some cases of inordinate salivation, recorded by Dr. Haskins, tend to prove, that emetics have considerable power in relieving the disorder.†]

Mercury
valuable as
a medicine. Like most other poisons, mercury, when properly directed, may be rendered a most valuable medicine; and is at this moment, in its multifarious forms, one of the most common, as well as one of the most efficacious, in the *Materia Medica*. In this place, however, we can only contemplate it as a source of disease.

β P. sensi-
tivus.
Mouth-
watering. A certain degree of active ptyalism is also well known to be produced by any high degree of mental or sensorial excitement; in which case the discharge most commonly assumes a frothy appearance. This is particularly the case with violent rage, which stimulates the salivary glands almost as much as grief does the lachrymal. And as the same muscles of the mouth and throat are strongly roused in epilepsy and lyssa, we have here also a like increase of saliva, worked into the same sort of foam, and accompanied with a similar biting of the lips and gnashing of the teeth. But the most striking proof of this effect is produced by an eager longing for agreeable food of any kind, whether seen, smelt, or only thought of; and which is vulgarly denominated MOUTH-WATERING.

* See Paris's Pharmacologia, vol. i. p. 202, 6th edit.

† Philadelphia Journal, No. 2.

In man, this increase of secretion is seldom so considerable as to occasion an involuntary flow from the mouth; but, in dogs, it flows freely and continuously; for here the salivary glands are peculiarly irritable, so that the animal is almost constantly salivating; the discharge appearing to answer the purpose of insensible perspiration in other quadrupeds.

GEN. II.
SPEC. I.

We meet also occasionally with an increased secretion of saliva from a cause less obvious, distinguished by a sweet or mawkish taste;* to which some writers have given the name of SWEET-SPITTLE.† It is the *dulcedo sputorum* of Professor Frank.‡ It may possibly exist, at times, as an idiopathic complaint, but is more usually connected with a morbid state of the stomach, and accompanied with a sense of nausea; the saccharine matter being formed, perhaps, by a like assimilating power as that possessed by the kidneys in diabetes. It is relieved by magnesia, and other absorbents; but is most effectually cured by an emetic, followed by warm stomachics. A lady of delicate habit, under my care, has been subject to this variety for some years. It returns irregularly, for the most part once in about a month or six weeks, and generally yields to a course of rhubarb, taken sometimes in conjunction with two or three grains of calomel. Bloch mentions a case in which it returned at periods still more regular.§ This variety of ptyalism is also occasionally the result of a scorbutic diathesis, but more frequently of phthisis; and especially in the last stage, when, as Frank observes, it is often “*insignis et ad nauseam usque molesta.*”

γ P. mellitus.

Sweet spittle.

A ptyalism frequently occurs during dentition; and is by no means an uncommon sequel or crisis of other diseases.

Ptyalism accompanies dentition; and fevers.

In all these, as I have already hinted, it proves salutary, and terminates the disorder that excites it. Fevers afford, perhaps, the most numerous examples of this; and the following case is worth relating: A lady, aged twenty-four, of a delicate constitution, was attacked with a typhus, in the spring of 1783, which ran on for three weeks. She appeared to be in great danger; but, on the twentieth day, a sudden and copious salivation took place that unaccountably afforded her great relief. It continued for upwards of a week, the daily flow from the mouth being never less than a pint and a quarter. In the mean while, she increased in strength, recovered her appetite, and got well.

We have numerous instances in which this discharge has proved equally serviceable about the acme of small-pox;|| though in one or two cases death has succeeded.¶ The fluid of dropsies is said to have been carried off at times by the same channel.

A crisis of small-pox and dropsy.

In the Medical Obs. and Inquiries, vol. iii. p. 241, there is a

* Act. Nat. Cur. vol. iv. Obs. 59. 89; vol. v. Obs. 71. Degaye, Diss. de Naturâ et Usû Salivæ. Monspel. 1783.

† Paullini, Cent. i. Obs. 81.

‡ De Cur. Hom. Morb. Epit. tom. v. p. 59. 85. Mannh. 8vo. 1792.

§ Bemerkungen, p. 203.

|| Act. Nat. Cur. vol. vii. Obs. 109. Fich, Diss. de Salivatione spontaneâ, præcipuè Variolarum. Jen. 1713.

¶ Riedlin, Lin. Med. 1695, p. 334. Weber, Obs. Med. Facie. i.

GEN. II.
SPEC. I.
γ P. mellitus.
Chronic vomiting hereby relieved.

singular case of an obstinate vomiting of five months' standing being relieved, upon a return of salivation, which for this period had ceased. But perhaps one of the most extraordinary instances to be met with is related by Dr. Huxham, in the Phil. Trans. vol. xxxiii. for 1724. The patient was a man aged forty, of a spare, bilious habit, who had an attack of jaundice, followed by a paroxysm of cholic, this last being produced by drinking too freely of cider. Among other medicines was given a bolus, containing a scruple of jalap, eight grains of calomel, and a grain of opium. Copious dejections followed; and a few hours afterwards the patient complained of pain and swelling in the fauces, spat up a little thick, brown saliva, which was soon considerably increased in quantity, of a deep colour, resembling greenish bile, though somewhat thinner. This flux of green and bilious saliva continued for about forty hours; during which time the quantity discharged amounted to four pints. The colour of the saliva then changed to yellow, like a solution of gamboge, with an increase rather than a diminution of the quantity. It continued of this colour for the space of forty hours more, after which it gradually became pellucid, and the salivation ceased as suddenly as it came on. During the flow of the saliva, the teeth and fauces were as green as if they had been stained with verdigris, and the teeth retained the same colour for a fortnight after the ptyalism had ceased. The patient had a few years before been suddenly attacked by a spontaneous salivation, so excessive as to endanger his life. In the present instance, therefore, it is probable that the dose of calomel co-operated with the peculiarity of the constitution in exciting the discharge. But, whatever was its cause, it proved critical both of the jaundice and the cholic; for, from the moment it took place, the pain of the bowels ceased, and the greenish colour of the skin began to subside, the urine being at the same time secreted more abundantly, and of a blackish hue.

SPECIES II. Ptyalismus Iners.—*Drivelling or Slavering.*

Involuntary flow of saliva from a sluggishness of deglutition without increased secretion.

THERE is a second species which belongs to this genus, in the present system distinguished by the name of *inert ptyalism*, and which depends upon a want of command or power over the muscles of deglutition, rather than on any increased action of the salivary excretories. In vulgar language it is denominated *DRIVELLING OR SLAVERING*. It occurs under the three following modifications:

- | | |
|---------------|-----------------------|
| α Infantilis. | Of infancy. |
| β Senilis. | Of old age. |
| γ Moria. | Of dotards or idiots. |

Causes.

It is found, therefore, in three states of life: among infants,

before the will has acquired a power over the muscles of deglutition, and is altogether distinct from the salivary flux of dentition; in advanced life, in which the will has lost its power; and in idiots, who possess the power, but seldom or never exercise it. In the first case, time is the best physician; in the two last, no physician can be of any avail.

GEN. II.
SPEC. II.

GENUS III. DYSPHAGIA.—*DYSPHAGY.*

Pain or obstruction in swallowing, without inflammation, and mostly without impeded respiration.

It is necessary to limit the character of this genus, as in the above definition, since inflammatory affections, in whatever part of the system they occur, constitute one natural order; and dyspnetic affections, or those essentially impeding the respiration, another Order; and should, therefore, be arranged and considered in their respective associations: the former under the diseases of the sanguineous function, and the latter under those of the respiratory.

[Deglutition is a very complex operation, requiring the concurrence of many agents, from the mouth, where it begins, down to the cardiac orifice of the stomach, where it terminates. M. Magendie divides deglutition into three stages; in the first, the food passes from the mouth to the pharynx; in the second, it passes the opening of the glottis, and the nasal apertures in the fauces, and is carried into the œsophagus; in the third, it passes through this tube, and enters the stomach. When a portion of food has been sufficiently chewed, it is placed by the actions of mastication upon the dorsum of the tongue. Mastication is then suspended, and the tongue applied to the roof of the mouth in succession, from its point to its base. The alimentary bolus is thus pressed towards the pharynx, and soon meets with the velum palati, which is raised up by it into the horizontal position, and made a continuation of the palate. As the tongue continues to press the food, it would push it towards the nasal openings in the fauces, if it were not for the tension of the velum palati, produced by the circumflex muscles and the constriction of the pillars. With the exception of the motions of the velum, these actions in the first stage of deglutition are slow, voluntary, few, and successive. In the second stage, the actions are simultaneous, multiplied, involuntary, and rapid; the food is conveyed by them only from the middle to the bottom of the pharynx; but quickness is essential, in order that the aliment may not insinuate itself into the glottis, impede respiration, or glide into the nasal openings in the fauces, or the apertures of the Eustachian tubes. The alimentary bolus no sooner touches the pharynx, than it is embraced by this part and the velum palati. At the same instant, the base of the tongue, the os hyoides, and the larynx, are raised and carried forward to meet the morsel of food, and transmit it rapidly over the glottis, which is now shut,

Limitation.

Organs
affected.

Mechanism
of degluti-
tion.

GEN. III.
Dysphagia.

and also covered by the descent of the epiglottis. By the continued pressure of the pharynx and velum palati, the food is next pushed into the œsophagus, the larynx descends, the epiglottis rises, and the glottis itself is opened again for respiration. In the third stage of deglutition, the arrival of the food in the upper part of the œsophagus causes the superior circular fibres of this canal to contract, and propel the aliment towards the stomach. The subsequent fibres, now distended, contract in their turn; and the same changes are continued in succession, until the food gets into the stomach. The experiments of Magendie convince him that the aliment passes very slowly down the œsophagus, and, when its ready entrance into the stomach is prevented, it will sometimes rise and descend again several times before it is ejected.* From the preceding account it must be manifest, that many different causes may be concerned in bringing on a difficulty of swallowing; and that dysphagy, strictly speaking, is not a disease itself, but only one of the most dangerous effects of the diseases to which the organs of deglutition are subject. The history of every form of dysphagy would make a very long detail, comprising an account of most of the diseases of the mouth, throat, nasal cavities, pharynx, and œsophagus, as well as of various accidental injuries of parts about the throat, and of many sorts of tumours within or near the mouth, the pharynx, or œsophagus.† In the present part of this work, the author enters into the consideration of the five following species:]

- | | |
|--------------------------|--|
| 1. DYSPHAGIA CONSTRICTA. | CONSTRICTIVE DYSPHAGY. |
| 2. ——— ATONICA. | ATONIC DYSPHAGY. |
| 3. ——— GLOBOSA. | SPASMODIC DYSPHAGY, OR NERVOUS QUINSY. |
| 4. ——— UVULOSA. | UVULAR DYSPHAGY. |
| 5. ——— LINGUOSA. | LINGUAL DYSPHAGY. |

General
symptoms
of Dys-
phagia.

[The several cases of dysphagia, arising from a diminution of the capacity of the œsophagus by disease of its texture, or from its being occupied or compressed by tumours of different sorts, are at first so similar in their symptoms and progress, that a successful discrimination of them is not always easy. In all of them, one of the earliest symptoms is a difficulty of swallowing solids, followed, after a time, by that of swallowing fluids. This inconvenience makes more or less rapid advances, and if not relieved by medical treatment (which is too often impracticable), terminates in a fatal interruption of the function of deglutition. With the exception of spasmodic dysphagy, and cases from mechanical injuries of the jaw and parts about the mouth and throat, almost all the species of dysphagy come on very gradually, and with so little annoyance, that at first they are apt

* See Magendie's Physiology, by Milligan, 2d edit. p. 233.

† Dysphagy, from dislocation of the os hyoides, is a case that has been mentioned by writers, but is generally discredited by practitioners: however, Mr. C. Bell had a preparation exhibiting a projection of one of the horns of the os hyoides into the pharynx, in consequence of ulceration. The possibility of dysphagy from displacement of the os hyoides is therefore proved.—See Surg. Obs. p. 60.

to be disregarded, more especially as the health is generally good, and the inconvenience in swallowing sometimes abates for a time, or even quite ceases. Nor in general can any defect be seen or felt in the mouth or pharynx; the food passes the isthmus of the fauces very well, and proceeds duly towards the stomach; but it soon rises into the mouth again, with a large quantity of saliva, unaccompanied by any effort of the stomach, diaphragm, and abdominal muscles. The patient again tries to swallow, and, perhaps, after repeated attempts, succeeds in getting the food into the stomach, in small quantities at a time. Thus the disease is allowed to go on unresisted for a long period. The kind of rumination, resulting from the inverted peristaltic action of the œsophagus, differs from common vomiting, inasmuch as the food is ejected without anxiety, indisposition, or cold sweats. Notwithstanding the difficulty of swallowing, the appetite often continues good, almost until the very approach of death.]

GEN. III.
SPEC. I.
Dysphagia.

SPECIES I. Dysphagia Constricta.—*Constrictive Dysphagy.*

Difficulty of swallowing, from a permanent contraction of the œsophagus.

SOMETIMES the diameter of the canal is diminished in particular parts by a thickening of the mucous membrane, fleshy excrescences, or fungous, or scirrhus tumours. The same effect may proceed from tumours formed between the coats of the œsophagus.* Sometimes a scirrhus thickening of its coats, or of the cellular membrane connecting them,† extends through its entire length; and sometimes it becomes contracted by the conversion of a portion of it into cartilage or bone. Besides these cases, there are other casual and symptomatic obstructions, which do not fall under our present survey, produced by hysteria, and other spasmodic affections; entheses, or the lodgement of foreign bodies in the canal; or external tumours, as in bronchocele, abscesses,‡ or aneurism of the aorta, pressing against its sides.

Diagnostics.

[The lining of the œsophagus, like all other mucous membranes, is liable to be thickened by inflammation; the diameter of the passage is thereby lessened; the muscular fibres cannot act upon it with their usual power; and the conveyance of the food into the stomach is more or less obstructed. According to Sir Everard Home, true strictures of the œsophagus, like those of the urethra, generally occupy but a small extent of the ca-

Stricture.

* See C. Bell's Surg. Obs. p. 60.

† See Armstrong's Morbid Anat. fasciculus 2; pl. 7. fig. 2.

‡ Mr. Carmichael has recorded two fatal examples of dysphagy, from abscess between the œsophagus and cervical vertebræ, where, from the situation and circumstances of the disease, as found on dissection, he conceives that the patients' lives might have been saved, had the collection of matter been discharged with a curved trocar.—See Trans. of Association of Physicians of Ireland, vol. iii. p. 170, &c.

GEN. III.
SPEC. I.
D. Con-
stricta.

nal, and are for a long time attended with very little thickening of the adjacent parts. The derangement is in the inner membrane of the tube; there is no apparent disease of the tunica vaginalis gulæ; nor any degree of thickening of the glandular structure of the œsophagus.* Strictures may occur in any portion of the tube; but their most frequent situation is immediately behind the cricoid cartilage at the termination of the pharynx. Sometimes the pharynx and beginning of the œsophagus is studded with scirrhus tumours of great firmness and whiteness, nearly closing the latter canal; while a general disposition to disease of its membrane is denoted by tumours of a similar nature lower down the passage. At the same time the membrane, reflected over the glottis into the trachea, may be thickened, and even swellings of the above description present themselves within the latter organ.† Another form of scirrhus of the œsophagus is very analogous to the disease called the scirrhus-contracted rectum; it involves all the coats of the tube, and, though it may affect the greater part of the passage, it generally commences either in the upper portion of it behind the cricoid cartilage, or far down near the cardia, where the structure is very glandular.‡ Scirrhus changes the texture of the œsophagus sometimes into a hard uniformly fleshy substance, and sometimes into a substance of a gristly nature, or intersected by membranes.§ Under such circumstances the canal is always rendered narrower, and often nearly closed. The disease is also frequently complicated with ulceration, which is mostly seen either above or below the most constricted point, not exactly in it.|| A fact, meriting attention, is, that obstructions situated high up in the œsophagus, frequently give rise to ulceration of the lower part of it near the stomach, just as strictures in the urethra frequently produce ulceration of that canal towards the bladder. In the œsophagus, this kind of ulceration is most liable to occur when the obstruction has existed a long time; and the frequent retching is conjectured to be the occasion of it. Though ulceration does not generally attack the most constricted portion of the tube, it does so in particular examples, just as it does in the urethra, and this in such a manner that the obstruction is more or less removed. Relief only follows this event, however, in cases of common stricture of the mucous membrane; for when the disease is of a scirrhus nature, ulceration always proves an aggravation of the complaint, instead of a possible means of relief. Indeed, when the œsophagus has been rendered even more capacious than natural, by the effects of scirrhus ulceration, the continuity of the muscular action, by which the food is transmitted to the stomach, is interrupted, and a disease, very different from stricture, resembles it in its most essential circumstance, the incapacity of swallowing.¶ By ulceration of the œsophagus, preternatural communications may

* C. Bell, Surgical Obs. p. 80. † Case by C. Bell, in op. cit. p. 59.

‡ See Monro's Morbid Anat. of the Gullet, &c. p. 325. § Baillie's Works by Wardrop, vol. ii. p. 93. || Ibid. ¶ C. Bell, in Surg. Obs. p. 62.

be formed between that tube and the trachea,* lungs,† or aorta.‡ The latter state may also be the result of disease first commencing in the great arterial trunk itself.§ Here also the remarkable case of Admiral Wassenaer deserves to be mentioned, who, according to Boerhaave, died suddenly in the act of attempting to vomit soon after dinner, and whose œsophagus was found to have given way in the seat of an ulcer, so that all the food and drink taken at dinner had become effused in the cavity of the chest. A similar case, in which the œsophagus was perforated near the cardia, and the contents of the stomach, together with a lumbricous worm, four inches in length, were effused in the chest, is recorded in a modern periodical work.||

GEN. III.
SPEC. I.
D. Con-
stricta.

Dr. Baillie once met with a very unusual stricture in the œsophagus, arising from the puckered state of the mucous membrane, which, as well as the muscular fibres, was quite free from all morbid alteration.

When the diameter of the lower portion of the œsophagus is much diminished, the food often accumulates above the most contracted portion of the passage, which becomes dilated above the obstruction, and is sometimes converted into a kind of pouch, nearly as capacious as the stomach itself. Cases of this description are recorded by Blasius and Haller. In most examples, the dilatation is a general one, comprising the whole circumference of the tube. The formation of a *cul-de-sac* pouch at some particular point is more rare.¶ However, in Dr. W. Hunter's museum may be seen a pouch of this kind formed at the lower end of the pharynx, and extending down behind the œsophagus. Its origin was ascribed to a cherry-stone, which remained three days in the lower part of the pharynx, where it made a depression, in which the victuals afterwards lodged. In about five years, the pouch was large enough to hold several ounces of fluid. Its situation and size, particularly when distended with food, occasioned extreme difficulty of swallowing, by which the patient was ultimately destroyed.** An example of a pouch at the lower and back part of the pharynx, and extending between the spine and œsophagus, so as to cause great difficulty of swallowing, is recorded by Mr. C. Bell. After death the bag was not found to be covered by muscular fibres, as in Mr. Ludlow's case, but consisted of a protrusion of the inner coat between the strong muscular fibres of the pharynx. The patient used to suffer as much from flatulence as from dysphagy, and, in consequence of the entrance of bougies into the opening of the sac, it was difficult to pass them.†† Pouches of this description are sometimes the result of abscesses, which burst into the pharynx. An instance, in which there were two large sacs reaching from

Œsophagus
dilated
above the
obstruction.

* Van Doeveren, Obs. Anat. Pathol. Lugd. 1789, obs. 2.; and Monro's Morbid Anatomy of the Human Gullet, p. 325, pl. ix.

† Bleuland, de Difficili Aliment. depulsione, obs. 1. p. 48. fig. 112.

‡ Van Doeveren, obs. 2. § Meckel, Manuel d'Anat. tom. iii. p. 377.

|| Revue Méd. Février, 1823. ¶ Meckel, Handbuch der Pathologischen Anat. tom. ii. ** Ludlow, in Med. Obs. and Inq. vol. iii. p. 85. †† C.

Bell, Surgical Obs. p. 64.

GEN. III.
SPEC. I.

D. Con-
stricta.

the pharynx along the sides of the œsophagus and trachea, and betwixt the former and the vertebræ of the neck, was seen by Mr. C. Bell. The mechanical operation of these pouches, and their valvular communications with the pharynx, by which the food that insinuated itself into them was confined there, occasioned the patient's death from irritation and inanition.*

Singular
case ter-
minating
favourably.

Cases of dysphagy, attended with the formation of the above kind of sacs, have been pronounced inevitably mortal.† This melancholy prognosis, it is to be presumed, would be fully warranted where the sac was the consequence of a scirrhus disease of the œsophagus; yet, if Dr. Odier has taken a correct view of a case that occurred at Geneva, an example, in which the œsophagus was in a scirrhus state, and there was a large prominent pouch on each side of the neck, yielded to medical treatment.] The food which the patient, a young nobleman, took, commonly remained in these sacs an hour or two, and was then thrown up. Hemlock pills were prescribed, and a bandage applied to the protuberance. As soon as the pills were rejected, which, like the food, they were sure to be in an hour or two, their place was supplied by others, so as to let the hemlock constantly act on the seat of the disease. The patient soon became relieved, and was gradually cured; the pouches disappeared, the aliments descended into the stomach, and the œsophagus recovered its former calibre.‡

Symptoms
of stricture.

[In cases of stricture from chronic thickening of the mucous membrane, the patient experiences, instead of actual pain, a sort of pressure or tightness, either in the course of the intestinal canal, or about the shoulders. He points out the exact part of the œsophagus in which the obstruction is situated; and the lower this point is, the greater reason has the practitioner to suspect a thickened state of the coats of the canal. The unpleasant sensations sometimes extend to the cardiac orifice of the stomach; but they are only felt when the patient makes attempts to swallow. In the early stage, the food does not return into the mouth till long after a meal, sometimes not till four or five hours afterwards. As the disease makes progress, however, the return is quicker, and the quantity of aliment brought up again larger. Lastly, when the case approaches its fatal termination, the food is often rejected almost as soon as the effort is made to swallow it.

Dysphagy, arising from scirrhus of the œsophagus, is attended with symptoms very similar to those of stricture. Pain, and inability to swallow solids, are the early symptoms. After a time the passage of fluids is arrested; they remain for a short time in the canal, and, distending it, create a sense of suffocation. At length, they are partly rejected by an inverted action of the œsophagus through the nose and mouth, and the rest passes down with a gurgling noise.§ By careful and experienced ob-

* Surgical Obs. p. 71. † Jourdan, in Dict. des Sciences Méd. tom. x. p. 439. ‡ Edinb. Med. Convers. vol. iii. p. 193. § See Monro's Morbid Anatomy of the Human Gullet, &c. p. 326.

servers, however, some circumstances have been noticed by which a scirrhus of the œsophagus is more particularly characterized. The patient is conscious of a dull pain and oppressive tightness, not only when he attempts to swallow, but at other times; and, if credit can be given to Wichmann, who first made this remark, the disagreeable sensation and the difficulty of swallowing cease in a great measure when the patient lies down upon his back. In addition to these particulars, Richerand's observation merits attention, namely, that a bougie is generally more easy of introduction, than in cases of stricture. The disease is reported to be sometimes met with in very young subjects as well as others, Percival having observed it in a child only thirteen years of age, and Wichmann in three children under eight. A question, however, here presents itself, namely, whether these were examples of scirrhus disease of the glandular structure of the œsophagus, or only scrofulous swellings of the lymphatic glands, which are well known to be particularly common in young subjects?]

GEN. III.
SPEC. I.
D. Con-
stricta.
Symptoms
of scirrhus.

Where osthexia, or an ossific diathesis, is present, the stricture sometimes assumes a bony hardness; and Metzger gives a pitiable case of this kind, in which the passage was so narrow that the unhappy patient perished altogether of hunger.* At times, indeed, the œsophagus has become entirely imperforate, either from the increasing contraction or the enlargement of internal or surrounding tubercles: of the former, Rhodius relates a singular case.† Examples of the latter have occasionally followed small-pox,‡ or strumous indurations.§

Stricture
sometimes
indurated
and bony.

In a few instances half the length of the œsophagus has been completely gorged by a single fleshy or glandiform excrescence; an instance of which is given in the Edinburgh Medical Essays; the patient died of marasmus in the seventh month from the commencement of the disease, and in the prime of his life. The tumour reached from the middle of the canal to the cardia, and so thoroughly blocked it up that a probe was with difficulty passed into the stomach on examining the part after death.|| An analogous case is recorded by Mr. C. Bell¶

Of stricture of the œsophagus it is often difficult to trace the remote cause. A neglected catarrh; common sore throat; small-pox; syphilis; a highly nervous or spasmodic diathesis; the smoke of tobacco;** the use of the *datura Stramonium*;†† the abuse of mercurial preparations; drinking too largely of coffee, or any other fluid immoderately hot or cold;‡‡ and an inflammation of the pharynx and œsophagus produced by swallowing soap-lees,§§ or other injuries; are various remote causes mentioned by writers. A temporary contraction of the œsophagus is said to have also been produced by worms in the

Remote
causes.

* Advers. Med. vol. i. p. 175. † Cent. ii. Obs. 46. ‡ Act. Hafn. vol. i. obs. 109. Eph. Nat. Cur. Dec. II. Ann. ix. obs. 45. § Mauchart, Diss. de Strumâ Œsophagi, hujusque Coalitu, &c. Tubing. 1742. || Vol. ii. art. xxiv. ¶ Surgical Obs. p. 79. ** Eph. Nat. Cur. Dec. iii. Ann. i. obs. 79. †† Ibid. Ann. ii. obs. 68. ‡‡ Bleuland, De sanâ et morbosâ Œsophagi Structurâ. §§ C. Bell, in Surgical Obs. p. 83.

GEN. III.
SPEC. I.
D. Con-
stricta.

stomach and intestines; and, in one or two instances, apparently by worms lodged in the hepatic and common duct.* [With respect to some glandular swellings and tubercles, by which the œsophagus becomes obstructed, there can be no doubt that they depend upon scrofula. Of the causes of scirrhus of the pharynx and œsophagus, nothing certain is known. Under the head of *dysphagia constricta*, the learned author of this work has included many diseases of very different characters, as common stricture, from a thickening of the mucous membrane of the œsophagus; scirrhus and various sarcomatous indurations and thickenings of the parietes of the canal; and obstruction of it by glandular swellings and other tumours, either situated between its coats or growing from them.

Treatment
of strictures
of the
œsophagus.

It is now almost universally admitted by practitioners, that no medicine has any power to remove a permanent stricture of the œsophagus arising from a thickened and contracted state of the mucous membrane. This is a case very different from spasmodic constriction of the canal, where no organic disease prevails, and the power of anti-spasmodic medicines, emetics, cold drinks, cold lotions, blisters, and alteratives, is considerable. In the instance of permanent stricture, as Mr. C. Bell truly observes, the proper course is the use of the bougie, and where the attempt to dilate the part brings on violent spasm and great disturbance of the constitution, even the application of caustic bougies is recommended, after the example of Sir Everard Home. In general, however, the common bougie should be preferred, and the armed one employed only in formidable and unyielding cases. In proportion as the stricture gives way, the size of the bougie must be increased. If an example were to present itself, in which the dysphagia was known to depend upon the connexion of one or more preternatural pouches with the pharynx or œsophagus, combined or not with a stricture or other disease of the passage, certainly the means from which the greatest relief might be expected would be the introduction of an elastic gum tube, by which the food might be prevented from distending the pouch, and the stricture at the same time dilated. Whether also the obliteration of the pouch might be safely attempted by throwing an astringent injection into it, as suggested by Mr. C. Bell,† future experience must determine. Hollow bougies are very important instruments in diseases of the œsophagus, not only as means of effecting a dilatation of strictures, but as a contrivance for feeding the patient without any action or disturbance of the diseased part itself.

In the early stage of a scirrhus or sarcomatous obstruction of the œsophagus, leeches, blisters, or issues on the throat may be tried,‡ together with an emetic, a course of the compound calomel pill, and occasional aperient medicines. The issues in the sides of the throat, and the use of bougies, Mr. C. Bell assures us, will effect a cure when there is a mere thickening from common inflammation or scrofulous action. Were a case

* Eschenbach, *Vermischter Bemerkungen*, i. p. 69. † Surgical Observations, ‡ See C. Bell's *Surgical Obs.* p. 53, &c.

of this description to present itself to the editor, he would be disposed to give the internal and external use of iodine a fair trial, as it is a medicine that certainly has great power in the dispersion of various other chronic swellings. Except in the above examples, however, little benefit can be expected from this or any other plan. In these cases, as well as in those of common stricture, the patient should generally be fed by means of an elastic gum tube, passed from the nostril down the œsophagus. The apparatus of the stomach-pump, when the pipe is not too large for introduction, is very convenient for the purpose.] In an early period of the disease, some benefit has been derived from hemlock and ammoniated copper. And sometimes mercury, carried to the point of salivation,* has been found highly serviceable.

GEN. III.
SPEC. I.
D. Con-
stricta.
Iodine.

Hemlock
and other
medicines.

Dr. Munkley relates one case of great severity, and even of some years' standing, in which mercury, carried to the effect of ptyalism, proved perfectly successful.

Cured by
mercury.

A stomach syringe, for diluting and washing away various poisons introduced into the stomach, whether by design or accident, was [first suggested by Renault in his work on poisons. Dr. Monro afterwards gave drawings of instruments for the removal of laudanum from the stomach.† However, until Dr. Physic‡ proved the utility of the stomach-pump in the case of a child, poisoned with laudanum, the invention gained little attention. As now perfected by Mr. Read and others] it appears to be admirably adapted to the joint object of enlarging the diameter of the œsophagus by a gradual pressure, and of conveying any quantity of liquid food that may be desirable. The instrument, as brought into notice by Mr. Jukes, consists of an elastic gum tube, a quarter of an inch in diameter, and two feet and a half in length, terminating in the lower extremity, or that introduced into the stomach, in a minute globe of ivory with various perforations, which for the present purpose must be omitted, and fitted at the upper end either by a screw or a plug to an elastic bottle of sufficient size to contain at least a quart of liquid, with a stop-cock fitted to it, as in the hydrocele bottle. Instead of the bottle, a pewter syringe may be adapted, of equal capacity, and used in the same manner.

Read's
stomach
syringe may
be advan-
tageously
employed.

Description.

The bottle or syringe being filled with warm water, and fitted to the tube already introduced into the stomach by the mouth or a nostril, on turning the stop-cock the water or other liquid may easily be forced into the stomach, and withdrawn by a reverse action: and hence laudanum, or any other poison capable of dilution, may be pumped up in a diluted state till the stomach is entirely unloaded; and liquid food may be introduced to any extent at option. Mr. Jukes has tried the instrument on himself, as well as on various patients, with complete success, in one or two cases after ten drachms of laudanum had been swallowed for the purpose.§

* Rush, Inquiries and Observations. Brisbane, Select Cases. Dobson, Med. Obs. Inq. vi. † Thesis de Dysphagia, Edinb. 1797. ‡ Eclectic Repertory, vol. iii. p. 111. Also Gibson's Institutes of Surgery, vol. ii. p. 362. § Lond. Med. and Phys. Journ. No. 48. p. 334.

GEN. III. SPECIES II. Dysphagia Atonica.—*Atonic Dysphagy.*

Difficulty of swallowing from debility of the Muscles of Deglutition.

Economy of deglutition.

THE external tunic of the œsophagus is muscular, and the muscular fibres are both transverse and longitudinal. The propulsion of the food from the fauces into the stomach commences in the action of the circular fibres of the pharynx, which contract in succession, and in a downward direction; and as this direction is continued to the muscular fibres of the œsophagus, the swallowed morsel is carried forward into the stomach by a progressive or peristaltic action.

Symptoms of Atonic Dysphagy.

Now, in all cases of debility in the muscles of deglutition, the contractile action of their fibres, and consequently their propulsive power, is lost or enfeebled, and a difficulty of swallowing must be the necessary consequence. [Persons of advanced years are most subject to dysphagy from paralysis of the œsophagus; though the disease sometimes occurs in the middle period of life, and even in youth. Thus, Dr. Monro records one instance of it, brought on in a country lad, nineteen years of age, by a previous febrile attack; and another case where it came on suddenly in a soldier, aged thirty-two, whose mouth was also drawn a little to the left side,* indicating the connexion of the complaint with apoplexy. In atonic or paralytic dysphagy, patients generally swallow solids more easily than fluids, the conveyance of which into the stomach requires a greater effort and a more complete agreement amongst all the organs concerned. A probang may readily be introduced down the passage, without producing any aggravation of the complaint, as it does in cases of spasm. The patient cannot fix upon any particular point as the situation of obstruction, and he is not sensible of any pain, tightness, or feeling of weight, except at the periods of making an attempt at deglutition. When the paralysis is complete, nothing can be swallowed, and it is indispensable to feed the patient by means of a tube. When liquids pass down a certain way, and are then forced up, the paralysis probably occupies only a part of the œsophagus. Atonic or paralytic dysphagy may be the effect of apoplexy and other diseases, or injury of the brain; also of fevers; of exposure to cold and damp; and of disorder of the digestive organs. It is a symptom of the last stages of fever and phthisis pulmonalis. In such cases, a small quantity of any fluid frequently cannot be swallowed, because it does not give a sufficient stimulus; but deglutition will be executed if a large spoonful be given.† The treatment of atonic dysphagy must vary according to the nature of the cause. When the disease is the consequence of apoplexy, the means, best calculated to lessen the difficulty of swallowing, are the same as those required for the relief of the original complaint. When the dysphagy has been associated with pain at the pit of the sto-

Causes.

Treatment.

* Morbid Anat. of the Human Gullet, &c. p. 231, 232.

† Monro, op. cit. p. 234.

mach, difficulty of breathing, palpitation, and flatulence, a cure has been accomplished by cordial volatile medicines, blisters, issues, and five grains of the pill myrrhæ comp. given every night at bed-time.* GEN. III. SPEC. II. D. Atonica.

In many cases, repeated blisters to the throat and chest, which stimulate from without, and tonic and astringent gargles, as of alum, catechu, rhatany, port-wine, and decoction of cinchona, which stimulate from within, will afford relief. Stimulating sialagogues may also be employed with advantage. Medical treatment.

A draught of cold water drunk frequently during the day-time, and especially at night and morning, has also as a tonic been frequently found useful. And if the habit be relaxed or irritable, the same tonic plan should be rendered general as well as local; and be especially combined with exercise, sea-air, sea-bathing, [electricity, galvanism, and the use of spirituous fomentations, or strong camphorated liniments, to the throat and neck. In some cases, recorded by Tode and Wichmann, a cure was effected by the free exhibition of quassia.†] Hard study must be relinquished, and, if possible, anxiety of mind.

SPECIES III. Dysphagia Globosa.—Nervous Quinsy.

Difficulty of swallowing from wind in the stomach, spasmodically compressed into the feeling of a ball ascending into the œsophagus, and producing a sense of strangulation.

From this feeling of a hard ball in the throat, the species is in the present system distinguished by the specific name of *globosa*. It is peculiarly common to persons of a nervous or spasmodic temperament: and is hence called by Dr. Darwin and many other writers *globus hystericus*, and by Dr. Heberden *nervous quinsy*. Synonyms.

Most frequently it occurs as a mere symptom of the hysteric or hypochondriacal affection; and on this account is regarded as such alone by many nosologists. It is, however, often to be traced in sudden gusts of passion, as fear, grief, and anger, especially in young subjects whose passions have never been disciplined; and at times exhibits so much violence as to threaten suffocation. In nervous habits, I have frequently met with it as a pure idiopathic affection; and, in a few instances, in persons who were not thus constitutionally predisposed to it. Causes.

Two clergymen of this metropolis, who bear an equally high character for pulpit eloquence, and have a very sufficient self-possession, have been occasionally under my care for some years in consequence of this complaint. One of them has most commonly been attacked during dinner; the regular action of the muscles, in swallowing, being converted, from debility of the organ, into the irregular action of spasm. The other re- Singular instances.

* Case by Dr. Carmichael Smyth, in Monro's Morbid Anat. &c. p. 231.

† See Dict. des Sciences Méd. tom. x. p. 444.

GEN. III. ceived the first paroxysm while reading the service in his own
 SPEC. III. parish-church, and was incapable of proceeding with it. In
 D. Globosa. this case, the regular action of the muscles of the glottis, in
 speaking, excited irregular action in those of the œsophagus
 from contiguous sympathy. And the effect was so considerable,
 that, when the clergyman came to the same passage of the
 liturgy on the ensuing Sunday, he was obliged to stop again,
 for he found he could not get through it. But he preached
 with as much fluency as ever; and this, too, with nothing more
 than a syllabus of his discourse before him. It was many
 weeks before he could summon courage to make another at-
 tempt in the desk; and his first effort was even then made in
 another church, and before another congregation. In this he
 was fortunate enough to succeed; and he has now entirely
 overcome the morbid habit.

Remedy at
the moment.

In both these cases, I have found the most effectual remedy
 at the moment to be a tumbler of cold water swallowed
 gradually, and the application of a handkerchief dipped in cold
 water to the throat. The spasm thus counteracted soon ceases;
 and, in the cases before us, has returned not only less frequently,
 but with far less violence. Yet, during the intervals, general
 tonics, a light diet at regular hours, and as much as possible
 horse exercise, have been had recourse to, and contributed
 their respective services.

General
treatment.

The usual anti-spasmodics, as volatile alkali, ether, camphor,
 assafoetida, and even laudanum, had formerly been tried, but, I
 was told, with little success.

Oil of the
white of
eggs.

When ether is had recourse to, whether in this or any other
 affection, the best means of dissolving it is a preparation little
 known in our own country, but which is introduced into the
 current French Pharmacopœia* under the name of *Oleum de*
vitellis ovi, obtained by evaporating the mixed yolks of eggs
 to about half; the oil is produced from this by pressure, but it
 must be afterwards filtered through paper to become refined.

SPECIES IV. Dysphagia Uvulosa.—*Uvular Dysphagy.*

*Swallowing obstructed or troublesome from relaxation and enlarge-
 ment, or from destitution of the uvula.*

How distin-
guished
from in-
flammation.

THE uvula is sometimes enlarged from inflammation; but, in
 such case, the disease, for reasons already stated, belongs to
 another class. In the inflammatory state, the uvula is hot,
 acutely painful, of a red or livid colour, and deviates, as it en-
 larges, from its proper form. In the species before us, its
 natural form and colour are scarcely interfered with, excepting
 that, as it grows larger and longer, it also grows paler. It is
 soft, relaxed, and œdematous. [The patient has a sensation, as
 if the throat were blocked up by some largish body; the an-
 noyance is considerable; and he is compelled to be continually

* Codex Medicamentarius, sive Pharmacopœia Gallica. Paris, 1818.

swallowing his spittle. The complaint depends upon relaxation of the azygos, or levator muscle of the uvula.]

GEN. III.
SPEC. IV.

The complaint, therefore, in this variety, requires to be treated with spirituous and astringent stimulants. Gargles of alum or port-wine form, perhaps, the best local applications; and should be combined with cathartics and general tonics. If the disease do not yield to this plan, the elongated and pendulous part must be extirpated.

D. Uvulosa.
Medical
treatment.

In a few rare instances, the uvula and even the tonsils become hard and cartilaginous; and, in such cases, the morbid portion must be cut away.

The uvula in its natural state appears to be concerned in deglutition; and, [as one of its purposes is to examine, as it were, the nature of the aliment previously to its being swallowed, and by its sympathetic relations to excite an aversion in the gastric organs to substances not of a fit consistence and quality to be conveyed into the stomach, it is endued with a much higher degree of sensibility than the rest of the soft palate. By means of this quick sensibility, and the sympathy of the rest of the organs of deglutition with it, they are, in all probability, excited duly to perform the harmonious and successive actions, by which the function of deglutition is accomplished.] And hence, when, from ulceration or any other cause, the uvula is lost or deficient, deglutition is rendered more or less troublesome, and even difficult. In this case, the healing art can administer nothing, and habit becomes the only physician. Examples are related, however, of so total a loss of the uvula, from gangrene, or the barbarous cruelty of cutting out the tongue, that the sad sufferer has been compelled to force the food in every meal into the œsophagus with his fore-finger.

Conse-
quence of
the uvula
becoming
lost.

SPECIES V. Dysphagia Linguosa.—*Lingual Dysphagy.*

Swallowing obstructed or troublesome from protrusion or magnitude of the Tongue.

THIS species exhibits itself under the two following forms or varieties:

- | | |
|-----------------|--|
| α Exsertoria. | Tongue extended from the mouth, often |
| Lolling tongue. | with enlargement of its substance. |
| β Ranula. | Intumescence of the salivary glands or |
| Frog-tongue. | ducts. |

It is necessary, as in the last species, to distinguish both these affections from inflammatory enlargements. [According to the editor's views of this subject, the only cases, which strictly accord to the author's classification, are certain chronic, and frequently congenital enlargements of the tongue; for the examples produced by mercury and poisons, though they were included in this section by Dr. Good, are in reality inflammations, and ought, therefore, to be arranged with other cases of inflam-

Congenital
and chronic
enlarge-
ments of the
tongue.

GEN. III.
SPEC. V.
α D. Lin-
guosa ex-
sertoria.
Examples.

mation. Galen mentions an example of a prodigiously large tongue, which was neither in a scirrhus, œdematous, nor inflamed state.* Scaliger also refers to a man, whose tongue was of so extraordinary a size, *ut mendacii suspicio silentium indicat.*† Marcellus Donatus was acquainted with a merchant at Mantua, who was in the same condition.‡ T. Bartholine quotes a case communicated to him by J. Valæus, in which a girl's tongue was as thick as her arm, and required to have a portion of it removed. The same author likewise describes a child, whose tongue, which was from the first larger than those of other children, became at length equal in size to a calf's heart.§ Similar instances of spontaneous preternatural growths of the tongue are recorded by Bardet|| and Maurant.¶ Another example of congenital enlargement of the tongue is described by Percy. The malformation had increased so much by the time the patient reached her eighteenth year, that it was impossible to see the sides and under surface of the tongue; and, though she could speak and sing, she was obliged to push her victuals to the back of her mouth with her fingers, in order to be able to swallow them.** A very interesting case is that of Philibert Hænhummer, who was born with a very large tongue, pendulous from the mouth. No material increase of the part was afterwards perceived till the boy was eight years of age. At this period it was of a purple colour, and covered with a thick foul coat of mucus. It descended three inches below the chin; its apex was rounded; the teeth of the lower jaw were displaced by it; its base was two inches and a half thick; and the whole cavity of the mouth was filled by it; so that respiration could only be carried on through the nostrils, and nothing but liquids could be swallowed. The patient was relieved by the amputation of about a pound of the tongue, and the extraction of the misplaced teeth.††

In another very similar case, nearly an English pound of the tongue was extirpated with ligatures by Dr. Mireau. In this instance, not only did the four lower incisor teeth project with their edges forward in the horizontal position, but the alveolar process was also displaced.

It is justly remarked by MM. Percy and Laurent, that cases of the above description must all be referred to the principle, by which other *lusus naturæ* and extraordinary congenital enlargements of parts are produced; and that they are widely different from the instances more commonly recorded, which are specimens of glossitis, and generally occasioned by acrid, venomous substances, inflammation, or, what used to be termed, metastases. In many of the congenital cases, however, it appears, that a further increase of the tongue proceeded from

* Lib. i. cap. 9. De diff. morb.

† Exercit. 199. cap. 1.

‡ Hist. Mirab. lib. vi. cap. 3.

§ Cent. 2. Hist. Anat. 22. || Bulletin de la Soc. d'Evreux, No. 23, p. 67.

¶ Journ. de Méd. an 1762, tom. xv.

** Dict. des Sciences Méd. tom. xxvii. p. 246.

†† MM. Percy and Laurent, vol. cit. p. 246.

Should be
discrimin-
ated from
cases of
glossitis.

the irritation of the part by the teeth of the lower jaw, and the consequently augmented determination of blood to it.

GEN. III.
SPEC. V.

Besides the impediment to deglutition, the enlarged and protruded state of the tongue gives rise to a constant loss of saliva, with which the victuals are therefore not duly impregnated; digestion is impaired, and the health suffers.

α D. Linguosa exsertoria.

The operation of removing the redundant portion of the tongue is the only means of relieving the above description of cases. Whether it should be done or not, must depend upon the degree of inconvenience caused by the swelling and size of the part. In cases of glossitis, on the contrary, this practice is quite improper; for, when they will not yield to the removal of their particular cause, and the employment of antiphlogistic treatment, one or more free and deep incisions in the dorsum of the tongue will generally afford prompt relief. The merit of making the efficacy of this method properly known to the surgical profession belongs to M. Delamalle, who wrote some interesting observations on the subject in the *Mém. de l'Acad. de Chir.*; but the practice was first introduced by Camerarius, Zacutus Lusitanus, and other older surgeons. In the modern periodical journals, we are constantly meeting with proof of its success.* Sometimes, however, the necessity for deep incisions has been superseded by bleeding from the raninal veins, blistering the throat, and other antiphlogistic measures.† In one very singular instance, where the enormous swelling was confined to the left half of the tongue, and bounded by the middle line, the application of six leeches two or three times to the inflamed part produced a speedy subsidence of the swelling.‡ In all cases of obstructed deglutition by enlargement of the tongue, the use of elastic gum tubes for the conveyance of food and medicines into the stomach, under urgent circumstances, should never be neglected.§

Means of relief.

M. Magendie, in the *Bulletin of the Philomathic Society of Paris*, for September 1817, quotes the case of a Jew, who was able to double his tongue backwards, and plunge it with the greatest ease into the pharynx; and tells us of a child who acquired the same power by imitating the Jew. The first efforts of the child were unsuccessful: but at length he ruptured the frænulum, and a hemorrhage ensued, which, nevertheless, did not alarm the boy, for he found, from that moment, that he could pursue the imitation more perfectly; till, by continued repetition, he too acquired the singular faculty of swallowing, in the same manner, his own tongue, without the least inconvenience to his respiration.

Singular instance of swallowing the tongue.

But the substance of the tongue under this variety is not always enlarged. M. Fournier knew a handsome young woman, sixteen years of age, who, although she had a long neck, had a slender and still longer tongue, insomuch that she could protrude

Not always enlarged, though elongated.

* See Martin's case, in *Edinb. Med. and Surg. Journ.* No. 92. p. 76.

† See *Edinb. Med. and Surg. Journ.* No. 93. p. 451.

‡ Graves, in *Dublin Hospital Reports*, vol. iv. p. 43.

§ See case by M. Manoury, *Journ. de Méd.* tom. lxxxvi.

GEN. III.
SPEC. V.
α D. Lin-
guosa exser-
toria.

and extend it to her bosom without stooping her head. And he tells us of another female whom he saw at Berlin, with a tongue astonishingly wide, but as thin as a cat's. When this woman laughed, the tongue covered the whole of her mouth, and hung out like folds of drapery. It was always cold, and communicated a most frigid sensation to the hand of another person.*

β D. Lin-
guosa
ranula.
Frog-
tongue.

[The Ranula, or *frog-tongue*, as it is commonly called, is a tumour under the tongue, consisting sometimes of a dilatation of the excretory duct of the sublingual gland; sometimes of a dilatation of the excretory duct of the submaxillary gland. The first case is denoted by its globular shape, and its situation exactly under the tongue; the second by its oblong figure, and its lying towards the side of that organ. The disease is most frequent in children; but is also met with in adults. The saliva contained in the swelling is generally of a very thick consistence, the effect of its long retention. The disease arises from an accidental obstruction or obliteration of one of the above mentioned ducts. When neglected, the tumour sometimes becomes so large that it occupies the greatest part of the mouth; forces the tongue backwards; impedes suction, mastication, and deglutition; obliges the patient to breathe entirely through the nostrils; propels outwards the canine and cutting teeth; and even forms a prominent swelling below the chin.†

Treatment.

When the tumour is recent, and not very large, it may be cured by making a free opening in it, and maintaining the aperture for some time by means of a small tube or tent. When, however, the swelling is of a considerable size, and of long standing, and the cyst is thick and indurated, a portion of the latter part must be removed.]

The irritation and enlargement proceed occasionally from a morbid secretion of calculous matter. Hence, when a ranula has been opened, the surgeon should always examine with a probe whether any calculous matter is lodged in it; and, if it be so, it should be at once extracted. M. Fournier records the case of a stone which was hereby formed under the tongue of a man only thirty-seven years of age, and at length acquired the size of a pigeon's egg. It was accompanied with great pain and profuse salivation; but the disease yielded to a removal of the morbid concretion.‡

[In the last edition of this work, the author adverted to a case communicated to him by Dr. Percival, of Dublin, and described it as a painful ranula: the disease, however, was evidently an enlargement of the tongue: "A horrid case of *dysphagia linguosa* has lately occurred in a young girl, who took a large drink of cold water whilst her mouth was sore from mercury. The protruded tongue lolled out on the chin, and was half cut through by the pressure of the lower teeth. The ulcer was exceedingly foul: but its appearance soon changed for the better by the use of mel rosæ and carbonas ferri." A ranula always pushes
v the tongue back, and not out of the mouth.]

* Dict. des Sciences Médicales, art. CAS RARES.
Traité des Mal. Chir. tom. i. p. 184.

† Case by Petit,
‡ Dict. des Sciences Médicales, art.

CAS RARES.

GENUS IV. DIPSOsis.—MORBID THIRST.

The desire for Drinking excessive or impaired.

BETWEEN the present and the ensuing genus, entitled LIMOSIS, or MORBID APPETITE, there is a close natural connexion, though their position is in different and even distinct organs.

GEN. IV.

The sense of hunger is well known to be seated in the stomach; and that of thirst in the mouth and fauces. [Thirst is a feeling of a still more urgent kind, and requiring instant satisfaction still more imperiously, than hunger; particularly in warm climates, or when any of the watery secretions are augmented, as in dropsy and diabetes. It is one of the most distressing symptoms in fevers and inflammatory complaints, especially in inflammation of the stomach. Hot spices, saline substances, and, in particular, common salt, increase it, as do all causes augmenting the different secretions. The end of drinking seems, therefore, to be for the repair of the losses of our fluids. If thirst be not satisfied, a general irritation comes on; the sensation of dryness in the mouth and fauces increases, and is accompanied with a burning feel, and a quickened pulse. But, although thirst appears at first very oppressive, drink is by no means so necessary to the continuance of the life of every animal, as food. Several species of warm-blooded animals, as mice, quails, parrots, &c. can subsist without drinking; and individuals of the human race have been known, by perseverance, to conquer the sensation of thirst. Sir G. Baker has recorded a memorable example, in the Trans. of the College of Physicians, of a man, who lived in perfect health for many years, without drinking.

Design of
thirst and
hunger.

Thirst and hunger may be compared to two sisters, united together for the common purpose of rendering the animal attentive to the preservation of its own existence. When their call is obeyed, they are a source of pleasure; when it is neglected, or resisted, they are a cause of great and even fatal suffering. But, in the production of these two very different results, pleasure and pain, thirst is far more energetic and intense than hunger. The quickness with which the taking of drink appeases the first of these sensations, contrasted with the slowness with which solid aliment is necessarily conveyed into the stomach, perhaps, may tend in some measure to explain the really greater enjoyment, generally felt in quenching thirst, than in satisfying hunger.

Their
differences.

In the great object for which thirst and hunger are instituted, namely, the nourishment of the body, the importance of the latter sensation is sometimes represented as greater and more evident than that of the second. Solid aliment, it is said, yields the essential constituent parts of the blood; and the utility of drinks, in relation to this fluid, is not always so manifest. Yet, how can this view be adopted, unless we shut our eyes to the large proportion of aqueous fluid in the blood, and to the immense quantity of water continually thrown out of the circulation by the lungs, kidneys, skin, and the secreting organs in general. The cessation of pleasure, however, the crisis to which the satisfying of either of these sensations leads, it is true, is less strongly mark-

GEN. IV. ed with respect to thirst, than hunger; and the disgust, experienced from cramming the stomach with solid food, can scarcely be said to be producible by taking a redundant quantity of beverage. Indeed, with regard to thirst, drunkards appear incapable of reaching that point, which, in the use of solid aliments, may be regarded as satiety. This difference probably depends upon the stomach immediately ridding itself of drink, while chymification requires the food to be retained in it a considerable time. Hunger and thirst differ strikingly from one another in the time and situation of their development, as well as in their local and general phenomena. Thirst, contrasted with hunger, comes on suddenly, and, if it be not quenched, it creates a state of suffering,—real pain; it is not at all like what, in relation to hunger, is called an appetite, which enters into the class of agreeable sensations. In thirst, the mouth, and especially the throat, are affected; in hunger, the stomach is the seat of uneasiness. Thirst, even when not very ardent, is accompanied with a true local and general excitement; while hunger, if at all protracted, occasions chilliness, paleness, and a disposition to fainting. The differences between hunger and thirst, when long continued, and assuming the character of diseases, or rather between the effects of a total abstinence from drink and those of a complete abstinence from solid food, are still more strongly marked. To use a term employed by Brown, the state of *sthenia*, of *erethismus*, of dryness, and of local and general heat; the increased activity in the general and capillary circulations; the energy of the external senses, of the whole nervous system, and of the muscular organs; the results of thirst, form a very manifest contrast to the prostration of every power of the constitution, to the languor of all the functions, and to the true *adynamia*, produced by unappeased hunger. Death, which is the end of both these scenes, takes place much sooner from thirst, and the more so, because no remission occurs in the cruel and progressive course of its symptoms. Death from want of solid food always comes on more tardily, and its phenomena, which are characterized by irregular paroxysms, are attended with remissions of greater or less duration.

Difference
in the effects
of extreme
thirst and
hunger.

But nothing is a better illustration of the differences between hunger and thirst, than the influence of disease over them. Who does not know that one of the first effects of most diseases is to augment thirst, and to make the patient need a larger quantity of drink, while the appetite is more or less completely annihilated, and a necessity for abstinence produced? Throughout the course of diseases, while thirst continues, the appetite cannot return; and even if it were to do so, in this state of things, it would only be a fallacious indication of a fictitious want that could not be safely satisfied. The decline of indisposition, and the approach of convalescence, denoted by the subsidence of thirst, have also, as one of their surest harbingers, the return of appetite. And, with regard to therapeutic means, is it not equally a fact, that beverages which assuage thirst, create appetite? that certain medicines, particularly anti-spasmodics

Influence of
diseases
upon them.

and opium, which diminish hunger, excite a good deal of thirst? GEN. IV.
and, lastly, that all generous alcoholic wines, which appease or delude the sensation of hunger, produce at the same time quite an opposite effect upon thirst?

Though the seat of thirst is now generally assigned to the mouth and fauces, some physiologists so far dissent from this doctrine as to refer the seat of thirst partly also, and even principally, to the stomach. They argue, that as this organ is the instrument of hunger, it must, by analogy, be likewise that of thirst; and that heating drinks and food, which merely glide over the throat, produce thirst chiefly by their action on the stomach, as is proved by the circumstance of thirst not being felt till digestion is going on in the stomach, and long after their application to the pharynx. They further argue, that the thirst, following a meal, is actually quenched by beverages which merely touch the parts in the mouth and throat momentarily, but remain more or less time in the stomach. They likewise take into consideration, that various aliments of mild qualities, like farinaceous substances, which do not at all irritate the pharynx in deglutition, excite a considerable degree of thirst after their introduction into the stomach. The only means of relieving thirst, so brought on, is to swallow plenty of fluid; for every other attempt at deceiving the patient's feeling is to little purpose.

Seat of the
sensation
of thirst.

It is conceived, that other observations tend to raise additional uncertainty respecting the true seat of thirst. Dropsical diseases, diabetes, profuse suppuration, copious hemorrhages, &c. are cases, in which the animal economy is deprived of a large quantity of fluid, without the physical state of the pharynx or stomach appearing to be more particularly affected, than any other part of the body. Nay, it is asserted that some rare examples have been met with, in which an irritation, a dryness, and redness of these organs were not accompanied with the least degree of thirst; and it is remarked, that whatever may be the cause and intensity of this sensation, it may certainly be appeased by the warm bath, clysters, and the injection of liquid into the veins; plans which replenish the system with fluids, but have no specific action either on the throat or stomach.

Although these reflections seem to the editor to bear more upon the question concerning the causes of thirst, than that relating to its seat, they are highly interesting, confirming the fact, that the present subject is involved in a great deal of mystery, and pointing out the obscurity that attends our internal sensations, compared with such as are derived from without.

Many vague hypotheses have been suggested, as explanations of the immediate cause of thirst. The least plausible ones must here be passed over in silence. By some physiologists, thirst is imputed to the dryness of the nervous papillæ of the pharynx, arising from a diminution of the salivary and mucous secretions. Yet, in numerous cases, thirst exists quite independently of a want of moisture in the pharynx; while such beverages as are calculated to prevent the dry state of that organ, do not always

Causes
of thirst.

GEN. IV. succeed in quenching thirst; and, in many instances, the best means of assuaging it, whatever may be its violence, are certain general therapeutic plans, which cannot possibly operate by moistening the pharynx, or its nerves.] In thirst, there is, perhaps, always a sense of dryness in the fauces; and yet dryness of this organ does not appear to be the cause of thirst; at least the intensity of the feeling does not appear to depend on the intensity of the dryness: for there is sometimes but little thirst, where the tongue, to its very roots, is covered with a thick and dry crust, as in the acme of continued fevers; while it is often vehement under the influence of violent passions, and intolerable on a surcharged stomach, when the tongue and fauces have no dryness whatever.

Diminution
of the
aqueous
part of the
blood.

Dupuy-
tren's ex-
periments.

[Another class of physiologists, considering, on one hand, the purpose of thirst, which leads us to take only such fluids as are fitted to dilute the blood and the secretions; and observing, on the other, the powerful influence that copious evacuations, by perspiration, diarrhœa, diabetes, and serous extravasations, have over this sensation, attribute the immediate cause of thirst to the abstraction of the aqueous part of the blood. Bichat inclined to this theory, and conjectured that the introduction of water into the veins would, by its mixing with the venous blood, have the effect of quenching thirst in the same manner as drink taken in the ordinary way. This conjecture is now ascertained to be a fact. By injecting water, milk, whey, and other fluids into the veins, Baron Dupuytren has frequently appeased the thirst of animals subjected to experiment, and long exposed to a burning sun. By varying such experiments with liquids, known to be agreeable or disagreeable to dogs, he found, that the animals derived from these liquids, so employed, the same sensation of tastes as if they had been given by the mouth. In fact, when milk was thrown into the jugular vein, the dogs made a lapping motion with their tongues, just as if they were taking the milk up with them.

Orfila's ex-
periments.

Some analogous experiments were made by Professor Orfila. In his valuable researches on Toxicology, he had frequent occasion to tie the œsophagus in dogs, in order to hinder the expulsion of the poisons which they had swallowed. For the purpose of appeasing their thirst, excited by the fever resulting from the extensive wound in their necks, he injected water into their jugular veins. This method of quenching thirst, the only one practicable while the œsophagus was tied, was practised in a great number of instances, and always succeeded in giving immediate relief. Professor Orfila also submitted the blood of animals, which had been long in a thirsting state, to distillation, and found that the diminution of its aqueous part was always in proportion to the length of their abstinence from drink.* The principal fact, interfering with the foregoing theory, is that of the frequently sudden production of thirst, without any previous abstinence from drink, sufficient to justify the suspicion of the

* See Dict. des Sciences Méd. tom. li. p. 469.

watery part of the blood having been in any way particularly lessened. But, as a well-informed writer remarks, although much obscurity prevails, concerning the efficient cause of hunger and thirst, their final cause is sufficiently obvious: they are the means, by which we are warned of the necessity of supplying the system with materials requisite for its existence. They belong to that class of actions which are termed appetites; where an effect, which is a compound of a physical and a mental operation, is connected with an evident useful purpose in the animal economy.*]

The common modes of quenching these agonizing sensations are well known to be eating and drinking: yet, when these cannot be indulged in, other modes may answer as a substitute. Thus, violent pressure against the coats of the stomach, whether externally or internally, is well known to take off the gnawing sensation of hunger; and stimulating the fauces, to take off the burning faintness of thirst. It is on this last account that chewing a mouthful of hay, alone, or merely moistened with water, proves so refreshing to a tired horse, and is found so serviceable when we dare not allow him, in the midst of a long stage, to slake his thirst in the natural way. Savages and savage beasts are equally sensible of the benefit of pressure in the case of hunger, and resort to it upon all occasions where they have no opportunity of taking off the pain in the usual way. The manis, or pangolin, that swallows its food whole, will swallow stones, or coals, or any other substance, if it cannot obtain nutriment; not that its instinct deceives it, but for the purpose of acquiring such a pressure as may blunt the sense of hunger which it finds intolerable. Almost all carnivorous beasts pursue the same method; and a mixed mass of pieces of coal, stone, slate, and earth, or other hard materials, is often met with in the stomach of ostriches, cassowaries, and even toads. The Kamscadale obtains the same end by swallowing saw-dust; and some of the northern Asiatic tribes, by a board placed on the region of the stomach, and rudely laced behind with cords, drawn tighter and tighter according to the urgency of the uneasiness. In our own country, we often have recourse to a similar expedient, and only exchange the tightened stomach-board for a tightened handkerchief.

It is possible, therefore, temporarily to overcome these natural sensations without the natural means: and the passions of the mind have as strong an influence on both as any of the substitutes just adverted to. Thus both are completely lost beneath the sudden communication of news that overwhelm us with grief or disappointment. So Van Helmont tells us that, happening to dislocate his ankle while walking with a good appetite to dine with a friend, his appetite immediately forsook him, but returned as soon as the joint was replaced, though the pain continued for some time with little alteration. There are some passions, however, as those of rage and eager desire, which, while they

GEN. IV.
These sensations, how quenched.

Pressure employed to deaden hunger by savage beasts.

The same by barbarous tribes.

Overcome by emotions of the mind.

Thirst increased by some passions.

* See Bostock's Physiology, vol. ii. p. 531.

GEN. IV. repel the sense of hunger, increase that of thirst. But they prove equally the close connexion of both feelings with the state of the nervous system generally; and the strong and extensive influence which is sympathetically exercised over them.

Morbid
thirst rarely
treated of.

MORBID THIRST, as a genus, is new to the science of Nosology; and hence the two species which belong to it have hitherto, in almost every instance, been separated from each other, and thrown loosely into remote parts of the classification. Dr. Young, however, offers an exception to this remark: for, with his accustomed accuracy, he has united them under a common head. The genus being new, it has hence been necessary to create a new name for it: and that of *Dipsosis*, from $\delta\iota\psi\alpha\omega$, "to thirst," has appeared not only most pertinent, but most consonant with the nomenclature in common use, which has naturalized various terms derived from the same root; as *adipsia*, *polydipsia*, *phobodipsia*; this last being a synonym for *hydrophobia*.

The two species of the genus are the following:

- | | |
|--------------------|--------------------|
| 1. DIPSOSIS AVENS. | IMMODERATE THIRST. |
| 2. ——— EXPERS. | THIRSTLESSNESS. |

SPECIES I. *Dipsosis Avens.*—*Immoderate Thirst.*

Constant desire of drinking; with a sense of dryness in the mouth and throat.

SIMPLE thirst is a natural;—immoderate or inextinguishable thirst a morbid, feeling. Yet even the latter is less frequently an idiopathic disease, than an individual symptom of some other complaint, or some peculiar state of body, the removal of which will alone effect its cure. [Whether, in the strictest sense of the expression, immoderate thirst is ever an original idiopathic disease, appears to the editor very doubtful; and, in the cases where it has been assumed to have been so, probably, this inference was drawn merely from the circumstance of no other disorder in the system being apparent. How often, however, is the practitioner compelled to observe only symptoms, and remain ignorant of their primary cause!]

Striking
instance of
idiopathic
dipsosis.

I have at this time under my care a young lady of about thirteen years of age, in other respects in good health, who is tormented with a thirst so perpetual that no kind or quantity of beverage seems to quench it for more than a few minutes. Emetics and purgatives have been tried in vain. Squills and other nauseating expectorants seem to promise more success. It has now lasted for several weeks.

The most grateful palliatives are the vegetable acids, and especially acescent fruits, and a decoction of sorrel-leaves (*rumex acetosa*, Lin.) slightly inspissated with gum-arabic or some other mucilage, and sweetened to meet the palate. Liquorice, which, among the Greeks, had so high a reputation for quenching thirst as to be honoured with the name of $\alpha\delta\iota\psi\epsilon\rho$, "the thirst extinguisher," has little or no effect. And it is most probably true,

as suggested by Dr. Cullen, that it only acts in this manner when the root is well chewed, by which means the salivary excretories become stimulated to an increased secretion of fluid.

In a foreign medical miscellany we have reported to us a case of the same kind, brought on by drinking a cold beverage during the paroxysm of a fever, that continued for more than a twelvemonth.* And in another foreign journal, we have an account of this disease as epidemic among children.†

The quantity actually drunk is sometimes enormous. Four hundred pints of wine and water have, in some cases, been swallowed daily.

As a symptom, excessive thirst is chiefly found in the hot fit of fevers, in dropsy, dysentery, diabetes, diarrhœa, and other discharges. It is also frequently excited in wet-nurses, as soon as the child takes hold of the nipple; but perhaps is felt most intolerably under the torture inflicted to compel a confession of guilt; in which case it is said to form the worst part of the suffering. The agony of violent thirst, brought on by bodily suffering, is well depicted in the description of the fatal scene in the memorable Black Hole of Calcutta.‡

GEN. IV.
SPEC. I.

Dipsosis
Avena.
Examples.

Quantity
drunk
sometimes
enormous.
Symptom-
atic thirst.

SPECIES II. Dipsosis Expers.—*Thirstlessness.*

Constant want of Thirst.

CONSIDERING that thirst is a natural feeling, and contemplating the vehemence of this feeling when extreme, it is not a little extraordinary, that instances of its total absence should ever occur. Yet there are many animals, and warm-blooded animals too, that never require drink, and consequently never thirst; as mice, quails, parrots. Here, however, the want of thirst, or desire to drink, is a natural condition in the economy of these animals. In man, and animals constituted like man, with a constitutional proneness to thirst, and an instinctive urgency to quench it by drinking, this want of desire can never take place without disease. [Whether this, however, should be referred to disease, or a natural idiosyncrasy, may be questionable. While immoderate thirst, unattended with any other manifest disorder of the constitution, has been set down by nosologists as an original idiopathic disease, thirstlessness, we perceive, is not viewed in this light, but regarded here as an effect of disease. In opposition to this conclusion, it should be recollected that some individuals have lived, seemingly in good health, without drinking. M. Bouffard records one instance, in which a young lady, twenty-two years of age, passed whole months without drink, yet appeared to be well in every other respect.§ Facts of the same kind are reported by Sir G. Baker.||] Cases of thirstlessness are not by any means frequent. Sauvages mentions two instances

Some animals never drink.

Thirstlessness in other animals a disease.

* Heuermann, Bemerkungen, i. p. 23. † Gazette de Santé, 1777, p. 93.

‡ Annual Register, 1758. § See Dict. des Sciences Méd. tom. li. p. 465.

|| Med. Trans. vol. ii. p. 265, &c.

GEN. IV.
SPEC. II.

Dipsosis
Expers.
Examples.

that occurred to himself. In the one, the patient, a learned and excellent member of the Academy of Toulouse, never thirsted, and passed months at a time without drinking, even in the hottest part of the summer: in the other, the patient, who was a female of a warm and irascible temperament, abstained from drinking for forty days, not having the smallest degree of thirst through the whole of this period.* Neergaard, as quoted by Blumenbach, has furnished us with other examples;† and M. Fournier informs us, that one of his most intimate friends reached, not long since, the age of forty-eight, without ever having drank of any fluid, or been thirsty; but he was accustomed to eat voraciously. It is singular, that he should have died of *dropsy* of the chest, apparently the result of a second bleeding for some accidental malady.‡

GENUS V. LIMOSIS.—MORBID APPETITE.

The appetite for food impaired, excessive, or depraved.

THE sensation of hunger, as observed already, is seated in the stomach; and, like that of thirst, is a natural or instinctive desire. It may, however, become diseased, and lose its natural character; and this in various ways, and accompanied with various sets of symptoms, each of which lays a foundation for a distinct species. Like the species of the last genus, however, they have hitherto been omitted in most Nosologies, or loosely scattered over different parts of the classification, though they evidently belong to a common family, and should be contemplated in a concentrated view. It is for this purpose they are now united under the banners of a single genus, to which I have ventured to give the name of LIMOSIS, from λιμος, "hunger," being the root of various terms current in the medical vocabulary; as, bulimia, alimia, alimon, alimonia, alimentum; though the three last have been commonly mis-derived by the lexicographers from *alo*, "to nourish;" unless *alo* itself be from the same source.

The species that properly appertain to it are the following:

| | |
|--------------------|--------------------------|
| 1. LIMOSIS AVENS. | VORACITY. |
| 2. ——— EXPERS. | LONG FASTING. |
| 3. ——— PICA. | DEPRAVED APPETITE. |
| 4. ——— CARDIALGIA. | HEART-BURN, WATER-BRASH. |
| 5. ——— FLATUS. | FLATULENCY. |
| 6. ——— EMESIS. | SICKNESS, VOMITING. |
| 7. ——— DYSPEPSIA. | INDIGESTION. |

* Nosol. Method. vol. i. p. 770, 4to edit.

† Blumenb. Physiol. sect. xxi. 322. J. W. Neergaard, Vergleichende Anatomie und Physiologie, des Verdauungswerkzeuge, &c.

‡ Dict. des Sciences Médicales, art. CAS RARES.

SPECIES I. Limosis Avens.—*Voracity.**Insatiable craving for food.*

THIS affection may be produced by a sense of faintness and inanition, without any known cause of exhaustion; probably in consequence of some organic error in the stomach; by gluttony, or an habitual indulgence in large and frequent meals; or by exhaustion from hard exercise, long fasting, fevers, or excessive discharges: thus offering the three following varieties of this species:

GEN. V.
SPEC. I.

- | | |
|-----------------------|--|
| α Organica. | From a feeling of faintness and inanition. |
| β Helluonum. | From an habitual indulgence in large and frequent meals. |
| γ Exhaustorum. | From exhaustion, as the consequence of hard exercise, fevers, or excessive discharges. |
| Hunger of exhaustion. | |

There are many persons who from birth, or a particular period of life, without any habit of indulgence, are capable of taking into the stomach an enormous quantity of food, and cannot be satisfied without it, from a constant sense of faintness and inanition; and who by no means increase in bulk in proportion to the quantity swallowed; being often, on the contrary, slender and emaciated.

α L. Avens
organica.
Canine
appetite.

It is difficult to account for this effect in every case; but, there is great reason to believe, that in general it depends upon some error in the structure or position of the stomach, by which means the food passes out of this organ as soon as it is introduced into it. [A very curious example of an approach of the stomach to the perpendicular direction, attended with a singular structure of that organ, has been lately recorded by Mr. Hart; but, unfortunately, the particulars of the appetite and digestion in this subject could not be ascertained.*] Ruysch gives a case, in which the diameter of the pylorus was considerably enlarged from relaxation; and there are others, in which it has been changed from its natural to a lower or dependent position, in consequence of the left side of the stomach being elevated by a dropsy of the ovarium, or an enlargement of the liver. The existence of a double stomach, or of an immediate insertion of the ductus communis choledochus into the stomach, though noticed as causes by Blasius and Bonet, are more doubtful. In the hunger of general exhaustion, forming our third variety, we know it to be produced by the secretion of an extraordinary quantity of gastric juice, by which the food is digested almost as soon as it reaches the digestive organ. That mimic feeling which is commonly known by the name of *false appetite*, was supposed by Galen to be produced by some acrimony in the stomach. Upon the theory of Dr. Wilson Philip, its real cause

Supposed
causes.

* See Dublin Hospital Reports, vol. iv. p. 326, &c.

GEN. V.
SPEC. I.

α L. Avens
organica.

Gastric
juice, how
far a cause.

Some cases
referrable to
another
principle.

Quantity
of food
devoured
sometimes
enormous.

Some-
times not
digested.

should be an excessive secretion of gastric juice itself; for it is the flow of this material over the interior of the tunic of the stomach that, according to him, excites the sense of hunger.* It should, however, be recollected, that, if this sensation be not indulged within a few hours, and in weak stomachs within a much shorter period of time, after its commencement, it suddenly dies away, and is succeeded by anorexy; although it is reasonable to suppose, that there is then in the empty stomach a much larger quantity of the secretion.

[Some cases of voracious appetite seem explicable, on another principle, connected with the theory frequently entertained of the proximate cause of hunger, namely, that it is a sensation excited in the stomach by sympathy with the wants of the constitution at large. For if any circumstance impede the nutrition of the body, hunger still remains, although the stomach be distended. Thus, in a case recorded by Morton, where the thoracic duct was ruptured, the child died in a horrible state of marasmus, notwithstanding it was continually taking enormous quantities of food to appease the violent cravings of its hunger. The excessive voracity of persons afflicted with a scirrhus pylorus,† or with disease of the mesenteric glands, is well known. In a very interesting case recorded by M. Gondret, where the whole of the stomach was thickened by scirrhus, and its capacity so reduced, that it was scarcely capable of holding eight or ten ounces of fluid, the patient suffered much from a continual and painful sensation of hunger.‡ The same fact is also exemplified in individuals, whose intestinal canal is preternaturally short, as in the remarkable example described by Cabrol. And even in convalescents, sadly emaciated by severe diseases, and whose appetite is sometimes almost insatiable, it seems as if a full state of the stomach could hardly lull the general feeling of inanition.]

Whatever be the cause, the quantity of food, devoured by persons labouring under this affection, is enormous, and in some instances almost incredible. Dr. Mortimer§ relates the case of a boy of only twelve years old, who, from a feeling of inanition, had so strong a craving that he would gnaw his own flesh when not supplied with food; when awake, he was constantly eating: the food given him consisted of bread, meat, beer, milk, water, butter, cheese, sugar, treacle, puddings, pies, fruits, broths, potatoes; and of these he swallowed, in six successive days, three hundred and eighty four pounds eight ounces avoirdupois; being sixty-four pounds a day on the average. The disease continued for a year: and in this case we have a clear proof, that the feeling of hunger did not depend upon any extraordinary secretion of gastric juice producing a rapid digestion: for the food was usually rejected soon after it was swallowed, but whether without passing, or after having passed into the duode-

* Treatise on Indigestion, &c. p. 73. 1824.

† See case by Mr. A. Burns, in Monro's Morbid Anat. of Human Gullet, &c. p. 334. ‡ Magendie, Journ. de Physiol. Expér. tom. i. p. 281.

§ Phil. Trans. vol. xliii. p. 366.

num, it is impossible to say. And there are other cases, related by Lommius, of a similar kind.

GEN. V.
SPEC. I.

In various instances, however, the food thus voraciously swallowed does appear to be digested, and that almost as soon as taken. Of this the case of the notorious Tarrare, as related to the National Institute by M. Percy, is a striking illustration. Before his enlistment, he was in the habit of devouring enormous quantities of the coarsest flesh, fruits, and roots: and, subsequently, he was found, after swallowing his own rations, to feed on the refuse of his comrades' messes, or offensive meat thrown on the dunghills; and to devour cats, dogs, and serpents. M. Fournier tells us, that at seventeen years of age, when he weighed only one hundred pounds, he could devour, in the space of twenty-four hours, a quarter of beef as heavy as his body; and that, on one occasion, when in the army, he devoured in a few minutes a dinner prepared for fifteen German labourers, and composed of various substantial dishes. There is a singular story, that the French commander attempted to turn this wonderful voracity and extent of stomach to a good account, by employing it as a safe deposite for a letter of secrecy which he wished to send to a French officer, at that time in the hands of the enemy. He sent for the man, showed him a wooden case containing the letter, and having put him into good humour by treating him with thirty pounds of liver and lights, prevailed upon him to swallow it, and to depart with all speed to the enemy's quarters. Tarrare, however, was taken prisoner in the attempt; and while in prison passed the box by stool before he could meet with the officer, but immediately swallowed it again, to prevent it from falling into the enemy's hands. He was strongly suspected of cannibalism; and was often repulsed with difficulty from the ward appropriated to the dead. He at length fled from the army in consequence of a rumour that he had devoured a child sixteen months old, which had suddenly disappeared. The alvine evacuations of this man were not immoderate; but after gorging his stomach, he slept and emitted torrents of perspiration, a symptom common to the disease. He fell at length into a hectic, and died of marasmus.*

α L. Avens
organica.

In other
instances
digested.

Singular
example
of canine
appetite.

Voracity is often a symptom of some other affection: it will sometimes occur, in the most capricious manner, during pregnancy, often in the middle of the night, or at some other unexpected period; when the patient, with a sudden sense of faintness and inanition, will perhaps devour an inordinate quantity of almost any food that can be obtained at the moment; though, in many cases, there is a fanciful longing for a particular kind, as for herrings, of which Tulpus gives an instance of a lady, who in this state devoured four hundred at a meal.† In these instances, it is probable, that the urgent desire becomes a stimulus to the secretions of the stomach, and that a greater quantity of gastric juice is in consequence poured forth.

Sympa-
thetic
voracity.

* Dict. des Sciences Médicales, art. CAS, RARES.

† Lib. ii.

GEN. V.
SPEC. I.
α L. Avens
organica.

In like manner, voracity and the sense of hunger occur also as a symptom in many cases of helminthia, or worms in the stomach or duodenum. But from the emaciation which usually accompanies such persons, it is most probable, that the inanition or emptiness of the stomach is here produced, not by a rapid or elaborate digestion, but by an irritable state of the muscles of the stomach, which contract too readily, and force the food into the intestines before chymification has taken place. In the Phil. Trans. Dr. Burroughs relates the case of a patient, who, from this cause alone, was rendered capable of devouring an ordinary leg of mutton at a meal for several days together, and fed greedily at the same time on sow-thistles and other coarse vegetables.

Treatment. The best means of treating idiopathic voracity, must be as variable as the efficient causes that produce it. When we have reason to ascribe it to a morbid state of the stomach in respect to tone or secretion, purgatives, and especially those that are warm and bitter, as aloes, may be found successful. Stimulating stomachics have been found equally so; whence Galen very judiciously recommends frequent and small doses of brandy, and Riverius, of ambergris. If these do not succeed, the stomach should be kept for some days in a state of constant nausea: and, with this view, as well as with that of destroying the morbid irritation on which the voracity depends, opium will often be found a highly salutary medicine. If the disease be produced by worms, or any other remote irritation, it can only be conquered by conquering the primary affection. And if it depend on a preternatural enlargement of the pylorus, a perfect cure is beyond the reach of art; though some benefit may be derived from strong external pressure.

β L. Avens
helluonum.
Gluttony.

The second variety, resulting from a gluttonous habit, is far more common, and very readily produced; insomuch, that there is not perhaps a corporate town in the kingdom that does not offer abundant examples of it. It is, in fact, one of the numerous evils to which idleness is perpetually giving birth; for, let a man have nothing to do, and he will be almost sure, whenever he has an opportunity, to fill up his time by filling up his stomach: and hence the lazy train of servants that vegetate from day to day, almost without locomotion, in the vestibule, hall, and other avenues of a great man's house, eat three or four times as many meals as their masters, who may possibly be employed, from morning till evening, in the courts of law, the committee-rooms of parliament, or in a fatiguing maze of commercial transactions.

Cause
obvious.

In tracing the cause of this voluntary disease, we have no difficulty whatever. When the stomach becomes accustomed to distention, it is never easy without it; and at length requires to be constantly full to be free from disquiet. It is also well known, that every sense grows more acute, the more it is employed: and hence the taste and longing of the glutton become more alive to what is relishing and savoury; he enjoys such

indulgencies more than other men, and turns with disgust from foods that are plain and simple. On this account, the difference between the craving of a pampered appetite and that of real hunger is extreme: the former, whatever be its longing, can only satiate itself on delicious and high-seasoned dishes; the latter is content with a fare of any kind, and enjoys the plainest more than the richest.

By constant distention the capacity of the stomach may become enlarged, and not only hold, but require for satiety, a far more copious quantity of food than in its natural state; and hence one cause of that enormous bulk of the organ which has often been mistaken for dropsy. Bonet gives a case, in which, owing to a mistake of this kind, the patient was actually tapped, and the contents of the stomach hereby discharged, death following soon afterwards. Magendie relates an instance that occurred to himself, in which the patient, then seventy-two years of age, vomited in a few minutes, from a stomach enormously distended, as much as filled two large pails.

It is not often that we are asked to attempt a cure of this complaint: it generally proceeds till the tone of the stomach is exhausted by its hard labour, and the cure is effected by the introduction of dropsy, or some other disorder worse than itself, which utterly extinguishes all appetite whatever. The man, nevertheless, who would honestly undertake to reclaim himself from this mischievous habit, and to acquire a better, should proceed in his career gradually; for organs that have long been under the influence of perpetual excitement would lapse into atony upon the sudden adoption of a severe counterplan. The food should gradually be plainer, less in quantity, and repeated at a greater distance of time; while the intervals should be filled up with some pleasant and active pursuit that may wholly engross the attention; for the surest way for such a man to produce faintness, flatulency, and uneasiness in his stomach, is to think about it. The bowels will at first, perhaps, be constive; but this may easily be remedied by occasional doses of the warmer and bitter purgatives, as aloes, colocynth, and rhubarb; which will operate as usefully by their tonic as by their aperient qualities.

The voracity, produced by an exhausted state of the system, is rarely of difficult removal; for, in general, it requires good plain food, and abundance of it. It is most usually consequent upon rapid growth of the body in the period of youth, fevers, excessive discharges, especially from the bowels or blood-vessels, long fasting, severe and uninterrupted exercise; and particularly the union of the last two, as often occurs in shipwreck, or the retreat from an enemy. It happens not unfrequently that, in such cases, the stomach occasionally overloads itself, and throws back some part of what has been swallowed. But this is of little importance, and often proves serviceable, by more effectually inculcating moderation, than can be accomplished by medical precepts.

GEN. V.
SPEC. I.
 β L. Aven
helluonum.

Enlarge-
ment of the
stomach
often here-
by produc-
ed.

Means of
reclaiming
from so
mischievous
a habit.

γ L. Aven
exhausto-
rum.

Ordinary
causes.

SPECIES II. Limosis Expers.—*Long Fasting.*

Loss or want of Appetite, without any other apparent affection of the Stomach.

GEN. V.
SPEC. II.

THE causes that lay a foundation for this species are numerous, and some of them are accompanied with a slight diversity of symptoms. The following are the chief varieties it offers to us.

α Defessorum.

Want of appetite from exhaustion.

From too great fatigue or protracted fasting.

β Pathematica.

Want of appetite from mental emotion.

From violent passion or other absorption of the mind.

γ Protracta.

Chronic fasting.

From habit, or other cause, enabling the system to sustain almost total abstinence for a long and indefinite time without faintness.

α L. Expers
defessorum.
Want of
appetite
from ex-
haustion.

Muscular exertion and long fasting, in a vigorous constitution, prove often, as I have just observed, the most powerful incentives to hunger. But, even in the most robust frame, if these are carried beyond a certain limit, the appetite palls, and is recovered with great difficulty: while, in the feeble and delicate, a very little exercise, and a slight protraction of a meal beyond the accustomed hour, and especially where the attention is directed to it, and hangs upon the delay, is productive of the same effect. In all these cases, the stomach is best re-excited to its proper feeling by half a wine glass of sherry or madeira, with a crust of bread or piece of biscuit; or, if there be very great languor, by a few drops of laudanum in a tea-spoonful or two of aromatic spirit of ammonia; while the interval should be filled up by what is most likely to attract the attention; for one of the surest revellents in uneasiness of the stomach is a strong excitement of the mind.

Best pal-
liative.

β L. Expers
pathema-
tica.
Want of ap-
petite from
mental
emotion.

I have just said, that a strong excitement of the mind is one of the surest remedies for general uneasiness of the stomach; and every day shows us how powerfully this acts in repressing or taking away the painful sensation of hunger. No man, perhaps, ever had an appetite for food under a full influence of the depressing passions, as fear or grief: he may eat from persuasion, or a sense of duty; but he eats without desire, or any craving sense of hunger. Hence those who are suddenly deprived of their senses by an overwhelming and unexpected evil, pass days and nights without food of any kind, exclaiming perhaps in the language of King Lear—

Causes of
this variety.

—When the mind's free,
The body's delicate: the tempest in my mind
Doth from my senses take all feeling else,
Save what beats there.

Even where the mind is simply but entirely abstracted, and

lost in itself while pursuing an abstruse problem or proposition, or adjusting a long train of intricate accounts in a banking-house, the individual has no sensation of hunger; and, if left alone, may perhaps persevere without knowing how the time proceeds, till warned by the darkness of the evening. And hence, La Bruyère, if I mistake not, in one of his pictures of an absent man, describes him, without any deviation from nature, as totally mistaken upon the subject of his dinner. Being summoned by his servant to the dinner table, he answers that he will come immediately, but still continues in the same place, and indulges in the same revery, for an hour; when, being summoned a second time, he shows himself angry at the interruption, and still more so at the servant's stoutly insisting upon it that he had not dined, and that the dishes were still upon the table untouched, while the master contended, on the contrary, that he had actually made his dinner, and that too in the dining-room.

GEN. V.
SPEC. II.

Examples
from La
Bruyère.

In simple cases of this kind, medicine is not wanted; and in the severer, it is of no use; for it is not in the healing art, under such circumstances, to "minister to a mind diseased." This must be left to time, the palliatives of friendship, and a change of scene.

General
manage-
ment.

The modifications, however, thus far contemplated, may be regarded as mere paroxysms, or acute cases of fasting. The most singular variety of the species consists in what may be called the chronic form of affection, exhibited in those who are able to endure an unbroken abstinence from food, for a long and indefinite period of time, without faintness or inconvenience of any kind.

γ L. Expers
protracta.
Long or
chronic
fasting.

The medical journals and ephemerides of different nations, and the transactions of learned societies, abound with examples of this last and most extraordinary modification: many of them extending to a term of time so apparently extravagant as almost to repulse belief, notwithstanding the respectability of the authorities appealed to. It is necessary, therefore, before any such histories are noticed, that I should lay down a few general principles, too well established to allow of controversy, which by their conjoint force may lead us more readily to an admission of such as are founded upon trust-worthy evidence.

1. As the stomach is capable of acquiring a habit of gluttony, or of craving too much, so it may acquire a habit of fasting, or of craving too little: or, in other words, we are as capable of triumphing over the appetite of hunger, as we are over any other appetite whatever.

Means of
accounting
for long
fasting.

The desire for food, or the sense of hunger, is very painful for the first two or three days, after which it ceases, and does not return unless stimulated by fresh food. The Chipeywas, or native savages of Canada, according to Mr. Long, give striking proofs of the power of the stomach in both extremes—that of hard eating, and that of hard fasting—and as nearly as may be at the same time: for when one of these is on the point of commencing a journey, he devours as much as he would otherwise take in a whole week. The daily allowance of animal food alone

GEN. V.
SPEC. II.

γ L. Ex-
pers pro-
tracta.

Brought on
mostly by
degrees:
rarely sud-
denly.

Small quan-
tity of food
actually de-
manded.

Water suffi-
cient food
for some
animals.

Air suffi-
cient food
for many
animals in
perfect
quietism.

Power of
long fasting
in cold-
blooded
animals.

being, on such occasions, as Captain Franklin tells us, eight pounds;* and having gorged the stomach, he starts upon his expedition, and commences a long season of severe abstinence.

2. Most of the cases of long fasting, that are credibly recorded, have been introduced by a habit of this kind. A few, indeed, have been brought on suddenly; as the result of an accidental shock, inducing an instantaneous and unconquerable antipathy to food: but by far the greater number are of the former kind; and have had their origin in severe abstraction of the mind, by intense study, rigid mortification of the natural feelings in a course of religious discipline, or some growing obstruction, or other affection, in the passage from the mouth to the stomach, or in the stomach itself, producing great uneasiness in deglutition, or digestion.

3. When a habit of this kind is once established, and a life of indolence or perfect quiet is associated with it, the quantity of food capable of supporting the animal frame may be reduced to a trifle, and may perhaps consist of water alone for weeks, or even months. We see examples of this in other animals than man. It forms a well-established fact in the history of fishes of various kinds. Even the pike, the most voracious, perhaps, of all fishes, when he has no longer an opportunity of indulging his gluttonous propensity, will both live and thrive upon water alone in a marble basin. The mere air of the atmosphere appears to afford nourishment enough for many forms of animal life. Snails and chameleons have been often known to live upon nothing else for years. Garman asserts it to be a sufficient food for the greedy spider; and tells us that, though the spider will ravenously devour flies and other prey, whenever he can seize it, he will not starve upon the spare regimen of air alone. Latreille confirms this assertion by an experiment of his own. He stuck a spider to a piece of cork, and cut him off from all food whatever for four months; at the end of which period he appeared to be as lively as at first. Mr. Baker in like manner confined a beetle under a glass for not less than three years; allowing him nothing but air for his diet; at the expiration of this period he was not only alive, but fortunate enough to effect his escape, and go in pursuit of a more substantial repast. And we are hence prepared to receive with less hesitation than we should otherwise do, the wonderful tales of frogs, toads, lizards, and other reptiles, found imbedded in trunks of trees, or blocks of marble, so deeply seated, that, though exhibiting life and activity on exposure to the atmosphere, they must have been blocked up in their respective cavities for fifty, and in some instances for a hundred years; cut off from every kind of food except the moisture by which perhaps they have been surrounded, and from all direct communication with the atmosphere itself: though, from experiments lately made by Dr. Edwards, it is absolutely necessary that there be an indirect communication of air through the pores or some other opening

* Journey to the Shores of the Polar Sea in the years 1819-22, p. 250. London, 4to. 1823.

of the surrounding substance.* Fishes, when rendered torpid by being suddenly frozen, are well known to live in this manner through the winter in the Polar Seas, and to be re-quickened into activity by the returning warmth of the summer. "The fish," says Captain Franklin, describing the winter he passed at Fort Chipecwan, on the skirts of the Polar Sea, "froze as they were taken out of their nets, and in a short time became a solid mass of ice; and by a blow or two of the hatchet were easily split open, when the intestines might be removed in one lump. If, in this completely frozen state, they were thawed before the fire, they recovered their animation. This was particularly the case with the carp. We have seen a carp recover so far as to leap about with much vigour, after it had been frozen for thirty-six hours."†

GEN. V.
SPEC. II.
γ L. Ex-
pers pro-
tracta.
In fishes.

4. It may possibly be observed that these examples are drawn, for the most part, from cold-blooded or exsanguineous animals, and that, in such cases, there is no waste of living matter by the skin, the great vehicle of discharge in animals of a higher rank. But they are drawn from animals that, in their common customs and habits, have the same instinctive craving for food, and the same faculty of converting it into their own substance, by the process of digestion, as animals of any superior class; while a like power of enduring long periods of fasting in a state of inactivity, without any injury to the general health, is quite as conspicuous and incontrovertible in many kinds of warm-blooded animals, and especially those that sleep through the winter season.

A like
power in
warm as
in cold-
blooded
animals.

[A combination of circumstances is generally essential to the occurrence, such as a diminution of sensibility and animal heat, a suspension of many of the functions, and especially a stoppage of the secretions and excretions. In this condition, individuals have been known to remain several weeks, and even whole months, without taking any food. Such cases are rare in the human race; but animals present us with annual examples of them. At the approach of winter, when they are large and fat, they fall into a torpid state, and continue so until the warmth of the spring return. During all this time they take no food, their respiration is surprisingly slow; the blood has rather a gentle undulation, than a circulation; and the trivial losses which take place are repaired entirely by the gradual absorption of fat. Hence, at the end of the torpid season, the emaciation of animals subject to its influence is very considerable. The emaciation, which an accidental or a forced abstinence of long duration brings on man, and the generality of quadrupeds, is also notorious. A hog, weighing about 160lb. was buried in its sty, for one hundred and sixty days, under a great mass of the chalk of Dover-cliff. When dug out, it weighed only 40lb. No food nor water happened to be in the sty when the portion of the cliff fell. The animal had nibbled the wood of the sty, and

* Mémoires sur l'Asphyxie, considérée dans les Batraciens. Paris, 1817.

† Journey to the Shores of the Polar Sea, in the years 1819-22, p. 248. Lond. 1823, 4to.

GEN. V.
SPEC. II.

γ L. Ex-
pers pro-
tracta.
Applied
analogically
to man.

eaten some loose chalk, which, from the appearance of the excrement, had passed more than once through the body.*]

5. We have reason, therefore, as well from analogy as from recorded facts, to believe it possible for man himself, under certain circumstances, not indeed to pass life altogether without food, but to lose all relish for it, and to habituate him to fastings of very considerable length, and only interrupted by slender portions of the sparest and dilutest aliment. [That hunger is a nervous sensation of the stomach seems probable, from its being influenced, like all the phenomena dependant on nervous action, by habit and by mental causes; from its being increased and excited by causes which act on the sensibility of the organ, as by spirituous drinks and spices, even when the stomach is filled; and by its being diminished by means of the contrary kind, as we know that opium will act in deadening the acute feelings of hunger, and that the Turkish and Indian fanatics called Mollahs and Faquirs are enabled by this means to support fasts of astonishing duration. The term, to which life may be prolonged without aliment, is uncertain. As Dr. Percival has observed, it varies with the incidental circumstances of the case, and the constitutional powers of the individual. It is remarkable, however, that deprivation of food is better borne in some species of disease, than in robust health. In certain hysterical cases, and scirrhus affections of the cardia and œsophagus, a degree of abstinence has been endured for many months, which, in other circumstances, could hardly have been sustained for as many weeks. In catâlepsy and mania, a very rigid abstinence may be borne for a considerable period.†] The cases are innumerable in which fasting has been endured ten, twelve, or fifteen days; and, where there has been access to water, twenty or thirty days;‡ Raulin mentions one of fifty-two days, water alone being drunk during the time:§ and Dr. Willan attended a patient who had fasted sixty-one days, with the exception of drinking from half a pint to a pint of water daily, mixed with a very small quantity of orange-juice, two oranges lasting him for a week, without any employment of the pulp.|| But there are other cases related at full length, and upon authority altogether unimpeachable, of fasting continued for twenty-five months;¶ three,** ten, fifteen, and eighteen years; and, with a very spare and only occasional taste of solid food, through the entire life. In the running commentary to the volume on Nosology, I have given several of these histories at some length, and the reader may amuse himself with them at his leisure.††

In most cases, and probably in all, if they had been critically investigated, water, tea, or some other fluid seems to have been indispensably necessary: and such was found to be the fact in the noted instance of Ann Moore of Tetbury that has occurred

Supported
by facts of
long fasting.

Fluids seem
to be always
necessary.
Fasting
woman of
Tetbury.

* Linnæan Trans. vol. ii. † See Dublin Hospital Reports, vol. i. p. 159.

‡ Phil. Trans. vol. xiv. p. 577. Mémoires de Toulouse, an 1788.

§ Observations de Médecine, p. 270.

|| Medical Communications, vol. ii.

¶ Bresl. Samml. band ii. passim.

** Phil. Trans. 1742. 1777.

†† See

also Mém. de l'Acad. des Sciences, l'an 1764. Stalpart Van der Wiel, Observ. Rar. Mem. of the Lit. and Phil. Soc. of Manchester, vol. ii. p. 467.

within our own day. That she was an impostor, in pretending to live without any food whatever, is unquestionable; but so very spare was the quantity she had accustomed herself to, from very great difficulty and pain in deglutition, that there is reason for believing that, for many years before she submitted to the test proposed, she had swallowed very little food of any kind, except tea and spring water. And such is, in truth, the recorded opinion of the active and very intelligent committee, which undertook the trouble of watching her night and day for a whole month, in rotation. Absolutely cut off from all fluids as well as solids, this woman was on the point of expiring when she reached the tenth day, and had scarcely strength enough left to confess the fraud she had been induced to practice. Yet the committee thus close their report of her history: "On the whole, though this woman is a base impostor with respect to her pretence of *total* abstinence from all food whatever, liquid or solid; yet she can, perhaps, endure the privation of solid food longer than any other person. It is thought by those best acquainted with her, that she existed on a mere trifle, and that from hence came the temptation to say that she did not take any thing. If, therefore, any of her friends could have conveyed a bottle of water to her, unseen by the watch, and she could have occasionally drunk out of it, little doubt is entertained that she would have gone through the month's trial with credit. The daughter says, that her mother's principal food is tea, and there is reason to believe this to be true."*

GEN. V.
SPEC. II.
γ L. Expers
protracta.

It is remarked by Hippocrates, that most of those, who strictly abstain from food for seven days, die within that period; and that if they do not, and even begin to eat and drink again, still they perish.

Where persons from famine, superstition, severe grief, or any other cause, have persevered in a course of rigid fasting for many days, and the frame is become frightfully emaciated and weakened, the greatest care is necessary in the administration of food; which at first should be light, liquid, and small in quantity; for not only the stomach but the organs of assimilation lose all power by degrees; and if once re-quickened are very apt to be unduly excited, and induce delirium and fever. It was in this way Dr. Willan lost his patient on the fifteenth day after his return to food, though the regimen adopted was peculiarly promising and judicious.

Great judgment necessary in the allowance of food for recovery.

SPECIES. III. *Limosis Pica*.—*Depraved Appetite*.

Appetite for improper and indigestible Substances.

IN this species there is no want of appetite, often indeed an inordinate craving; but instead of its directing the patient, as in the first species, to palatable and substantial food, whenever such

Difference as compared with the preceding species.

* Full exposure of Ann Moore, the pretended fasting woman of Tetbury.

GEN. V.
SPEC. III.

can be obtained, it urges him in preference to the most whimsical and innutritive materials. This character forms the specific definition. The specific name here given is *PICA*. Not that the term has any particular or very obvious merit; for, its origin and primary meaning are doubtful; but that, out of many terms with which nosology has been encumbered to express this disease, *pica* appears to be the most general, and there is no sufficient reason for changing it.

Now, an appetite for improper and indigestible substances may be of two descriptions. It may proceed from a want of taste or discrimination, as in infants or idiots: or from a corrupt taste, or corrupt indulgence, often founded on empirical or other dangerous advice, as the eating of chalk or acids to produce a fair skin; and we have hence the two following varieties:

- | | |
|--|--|
| <p><i>a</i> Insulsa. Unwitting <i>pica</i>. <i>β</i> Perversa. Perverse <i>pica</i>.</p> | <p>From want of correct taste or discrimination. From a corrupt taste or indulgence.</p> |
|--|--|

a L. *Pica insulsa*.

Produced partly by habit.

The depraved appetite, which is sometimes manifest in infants, can only proceed from want of proper management and direction: for nothing is more tractable than the organ of taste in early life. And hence, indeed, it is that the different nations of the world are brought by habit, and habit almost coeval with their birth, to prefer such kinds of food as their respective climates produce in greatest abundance, or as they obtain by an easy barter of indigenous substances. Thus, the Hindoos live entirely on fruits and grain; the Tonguses, on berries, the refuse lichen found undigested in the stomach of the rein-deer, dried fishes, and beasts of prey; the Californians, on snakes, rats, lizards, rabbits, intermixed with the wild herbs of the soil. But perhaps there is no stronger proof of the force of habit in forming an acquired taste to be met with in any part of the world, than in our own country; in our exchanging the natural and instinctive desire of a bland and sweet fluid, as milk, for the bitter beverage of tea for breakfast, and beer for dinner.

On this account it is not to be wondered at that children, without a guidance, or with an improper one, should often acquire depraved or vicious tastes, and be longing for substances that are innutritive or even hurtful to the general health. Where this propensity has obtained a footing, it may be successfully opposed by discipline, and overpowered by a counter-habit. Among idiots it is incorrigible.

β L. *Pica perversa*.
Longing.

Sometimes produced by an internal morbid excitement. Often by vanity.

A longing for improper and indigestible substances, however, is often produced by other means, and occurs in persons who are possessed of a sound judgment. It is frequently to be traced as a symptom of some other disease, as pregnancy, chlorosis, and perhaps some species of mental emotion: in all which cases, it is only to be cured by curing the primary disorder. But it sometimes exists as a primary malady, and is then most commonly brought on by a vain desire of improving the beauty of the person, of giving a graceful slenderness to the form, or a

languishing fairness to the skin, through the medium of chalk, acids, or other empirical materials. In consequence of which, the Greek physicians, in whose day the practice seems to have been more common than even in our own, and this, too, among young men as well as young women, gave to this variety of the disease the name of *μαλακία*, *softness* or *effeminacy*. GEN. V. SPEC. III. β L. Pica perversa.

Whatever the cause, when this morbid propensity has once obtained a triumph over the natural taste, the substances for which it excites a desire are often not only of the most indigestible but disgusting quality. We have had examples of an inclination for devouring dirt, cinders, ordure, fire, spiders, lice, toads, serpents, leeches, bits of wood, squills, hair, candles, and more literature, in the form of paper and printed books, than is devoured by the first scholars in Christendom. Substances devoured of the most disgusting quality.

Borelli gives us numerous examples of most of these; and some of them of a very extravagant kind;* and those who are desirous of gratifying themselves still farther may have full indulgence by consulting the Ephemerides of Natural Curiosities. Mr. John Hunter describes a longing for dirt, in the form of clay or loam, to have been an endemic disease among the blacks in Jamaica.† But he is surpassed by Dr. Darwin, who tells us, that he once saw a young lady, about ten years of age, that had filled her stomach with earth out of a flower-pot, and then vomited it up with small stones, bits of wood, and wings of insects amongst it.‡ Dirt-eaters of the West Indies. Singular case related by Darwin.

There are other persons who have had a taste for harder substances, and have glutted themselves with stones,§ glass,|| and even leaden bullets.¶ Others, again, have feasted on pieces of money, which have sometimes formed a very expensive repast; for Borelli gives us an instance of a pantophagist who swallowed a hundred louis-d'ors at a meal.** Yet, perhaps, after all, the most marvellous, though certainly one of the most common exhibitions of depraved taste, is an appetite for knives. There is not a country in Europe but has furnished examples of this in both sexes: and hence the medical journals and miscellanies are numerous in their descriptions of London knife-eaters;†† Prussian knife-eaters;‡‡ Bohemian knife-eaters;§§ and even, out of Europe, Brazilian knife-eaters.|| || The wretched patients have sometimes perished shortly after the extraordinary feat; and sometimes dragged on a miserable existence for a few years, before they fell victims to their madness or malady. In a few instances, they have recovered. Singular examples of metallic and other hard substances devoured.

In an extraordinary instance of this kind, that not long since occurred in our own country, the knife-fancier, Cumins by name, and by craft a sailor, lived ten years after his first experiment, and occasionally persevered in the same trick during the Cummings, the knife-swallower.

* Cent. i. Obs. 24. 52; ii. 37; iv. 25. † Obs. on the Diseases of the Army in Jamaica. ‡ Zoonom. cl. III. i. 2. 19. § Act. Hafn. vol. v. || Camerarius, Memorab. Cent. v. ¶ Bonet, Medic. Septentrion. lib. i. p. 510. Binniger, Obs. cent. ii. ** Cent. iv. Obs. 95. †† Act. Hafn. v. 107. ‡‡ Dölæus, Encycl. Chir. p. 679. §§ Crollius, Basilic. Chym. præf. p. 119. || || Binniger, Cent. v. Obs. 7.

GEN. V.
SPEC. III.

β L. Pica
perversa.

American
knife-swallow-
er.

whole of this time. The rash act is sometimes overcome, and the materials discharged piece-meal; and it might have been so in this man, but for the fool-hardiness that made him insensible to the earlier warnings given him, and urged him to a repetition of the offence.* Even the American States seem of late to have furnished us with a similar example, in a young man who had long, we are told, been in the habit of swallowing various indigestible substances, as buttons, musket-bullets, and billiard-balls; and being thus initiated in the art, on June 22, 1822, swallowed not less than fourteen knives within the course of the day. Repentance came too late. He sunk gradually beneath his exploit, and died on the ensuing 25th of August. Two of the knives had been discharged from the body, one was found in the œsophagus, and the rest in the stomach. The same individual is said, on one occasion, to have swallowed a gold watch, with its chain and seal, and to have evacuated them on the ninth day, darkened in colour, but not otherwise injured.†

Wonderful
effects when
united with
pica avens.

If this variety should happen to be united, as it sometimes is, with *pica avens*, or voracity, there may be no bounds to the deglutition, either in quantity or quality. M. Fournier, in his *Cases Rares*, has given us an instance of this kind, so extraordinary, that if it had not been most unexceptionably attested, it would not have been credible. A galley-slave, he tells us, of this description, and who was disordered in his intellects, fell at length a sacrifice to a colic, accompanied with a cough; and, on opening him, the stomach was found to occupy the left hypochondrium, the lumbar and iliac regions of the same side, and to stretch down into the pelvis. It was of a long, square form, and contained the following substances: a piece of stave, *nineteen inches long*, and half an inch in diameter; a piece of a broom-stick, six inches long, and half an inch in diameter; another piece of the same, eight inches long; ditto, six inches long; twenty-two other pieces of wood, of three, four, and five inches in length: a wooden spoon, five inches long; the pipe of an iron funnel, three inches long, and one in diameter; another piece of funnel, two inches and a half long; a pewter spoon entire, seven inches long; another, three inches long; another, two inches and a half long; a square piece of iron, weighing nearly two ounces; various other articles, among which were nails, buckles, horns, knives, &c.; the whole weighing about twenty-four ounces avoirdupois.‡ So that the stomach of this unhappy being became gradually enlarged into a warehouse for all sorts of marine stores, as the term is applied in the present day.

Medical
treatment.

This morbid organ is best opposed by giving a counteraction to the action in which it exists. And hence emetics and purgatives are highly useful. Rhubarb is perhaps the best medicine

* Marcet, Trans. of the Medical and Chir. Society, vol. xii. p. 52.

† New-York Medical Repository, Oct. 1812.

‡ Dict. des Sciences Médicales, art. CAS. RARES.

for the latter purpose ; and in moderate doses it should be continued daily ; and in combination with it, bark, steel, and other tonics. An acid has often been suspected as the cause of the disease, and the absorbent earths, as chalk, magnesia, and Armenian bole, have been tried in large quantities ; but the relief they afford is seldom more than temporary. In the *mal d'estomac*, or *cachexia Africana*, as it has been called, which is the disease of dirt-eating among the negroes referred to by Mr. J. Hunter, perhaps great acidity may exist, and instinctively call for the drier earths, as absorbents.

GEN. V.
SPEC. III.
β L. *Pica*
perversa.

SPECIES IV. *Limosis Cardialgia*.—*Cardialgy*.

Impaired appetite, with a gnawing or burning pain in the stomach or epigastrium, and a tendency to faint.

THE symptoms, laid down in this definition, are sufficiently marked to separate *cardialgy* from *dyspepsy*, in which it is merged by Dr. Cullen and various other writers : for in the last there is not necessarily a gnawing or burning pain ; and the appetite is rather fastidious, than essentially, or at all times impaired. *Cardialgia* is certainly sometimes found as a symptom in *dyspepsia*, as it is also in a multitude of other complaints ; as flatulency, *scirrhus*, or inflammation of the stomach, worms, retrocedent gout, suppressed menstruation, and various diseases of the heart, liver, pancreas, kidneys, and intestines ; in *hypochondrias*, and in sudden and violent emotions of the mind : but it is likewise found, in many instances, as an idiopathic affection, and should therefore be described as such.

How distinguished from *dyspepsy*.

Cardialgia admits of the three following varieties :

α *Mordens*.
Heart-burn.

Gnawing or burning uneasiness, felt chiefly at the *cardia*, the tendency to faint being slight.

β *Syncoptica*.
Sinking heart-burn.

The pain or uneasiness extending to the pit of the stomach ; with anxiety, nausea, coldness of the extremities, failure of strength, and great tendency to faint.

γ *Sputatoria*.
Black-water.
Water-brash.

Burning pain extending over the *epigastrium* ; and accompanied with an eructation of watery fluid, usually insipid, sometimes acid.

The first variety is perhaps the most common form of the disease. And as the gnawing or burning pain is in this case felt chiefly at the *cardia*, or upper orifice of the stomach, the specific name of *cardialgia* is derived from this symptom. The *cardia* is indeed generally supposed to be the immediate seat of affection : but this is an erroneous view. It is from the greater sensibility of the upper orifice of the stomach than any other

α L. *Cardialgia mordens*.

GEN. V.
SPEC. IV.

part of it, that we are most sensible of uneasiness in that region: but irritability of the whole, or of any other part of the organ, and perhaps of the adjoining organs, as the pancreas, spleen, and liver, will often produce the same local pain; and in some instances it has been ascertained after death to have been occasioned by a scirrhus, or some other obstruction of the pylorus.

β L. Cardi-
algia syn-
coptica.

In the second variety, we find the pain or uneasiness somewhat less intense, but far more general; reaching, indeed, over the whole range of the stomach and epigastrium, accompanied with nausea and anxiety; and by sympathetically affecting the general system, attended with coldness of the extremities, failure of strength, shortness of breath, and great tendency to faint, which continues till the system re-acquires warmth and perspiration.

From the wider circumference of the affection, Hippocrates denominated it *peridynia stomachi*. It is distinguished in popular language by the name of *sinking heart-burn*.

γ L. Cardi-
algia sputa-
toria.

The third variety is distinguished by a morbid increase in the quantity of the fluids secreted; and hence the peculiar symptom of an eructation, frequently in considerable abundance, of a thin watery liquor; chiefly in the morning, after food has been abstained from for many hours, and the stomach has nothing in its cavity but its own fluids. Dr. Cullen has admirably described the disease; though he has singularly separated it to a great distance from dyspeptic affections, transferred it to another order, and erected it, apparently contrary to his own mode of reasoning, into a distinct genus. "It appears most commonly," says he, "in persons under middle age, but seldom in any persons before the age of puberty. When it has once taken place, it is ready to recur occasionally for a long time after; but it seldom appears in persons considerably advanced in life. It affects both sexes, but more frequently the female. The fits of this disease usually come on in the morning and forenoon, when the stomach is empty. The first symptom is a pain at the pit of the stomach, with a sense of constriction, as if the stomach were drawn towards the back; the pain is increased by raising the body into an erect posture, and therefore the body is bended forward. This pain is often severe; and, after continuing for some time, brings on an eructation of a thin watery fluid in considerable quantity. This fluid has sometimes an acid taste, but is very often absolutely insipid. The eructation is for some time frequently repeated; and does not immediately give relief to the pain which preceded it, but does so at length, and puts an end to the fit."* To this description it may be added, that, when the watery discharge is altogether insipid, there is merely an increased secretion of the fluids poured into the stomach, apparently in a thinner or more dilute condition; and that, when this discharge is of an acrid taste, the gastric or other juices, which exist simply and without food or other intermix-

Excellent
description
by Cullen.

ture in the stomach at the time, possess an acidity in themselves; a fact which closely connects pyrosis with cardiagia as a species, and readily reduces it to the rank of a variety under its banner. In the colloquial tongue of England, it is called *black-water*; in that of Scotland, *water-brash*, and *water-qualm*. It is the pyrosis of Sauvages and many other writers.

GEN. V.
SPEC. IV.
Limosis
Cardialgia.

Most of these varieties have sometimes returned periodically,* especially in the spring:† and as their general causes and mode of treatment do not essentially differ, it is more convenient to consider them jointly than under detached heads. Dr. Perceval, of Dublin, in the manuscript comment with which he has obliged me on the Nosology, ingeniously enquires, “Does it ever arise from an affection of the pancreas?” I think it likely that it does, from contemplating the structure and office of this organ; and we have various cases in which, after death, the pancreas has been found considerably enlarged.

General
connexion
of the
varieties.

The remote causes then of the present species, under whatever variety it shows itself, which is chiefly regulated by the habit or idiosyncrasy of the individual, are indigestible food or other ingesta; and habitual and copious use of very cold or very hot beverages, but especially the latter; indulgence in spirituous potations; worms, hydatids, and insects, or their larvae; drastic purges; obstructed perspiration; repelled cutaneous eruptions; and bile depraved, or excessive in its secretion. Of the indigestible foods, the most common are animal fat, oil, butter, or cheese eaten in excess; which last has produced a cardiagia that continued for three years.‡ The stones or kernels of fruits have often laid a foundation for the complaint, especially where they have remained, as they have occasionally been found to do, and particularly cherry-stones, for two, or even for three years, with little or no change whatever.§ It occurs also, as already observed, not unfrequently as a sequel or symptom of some other affections.

General
causes.

All these causes have a direct tendency to produce imbecility of the stomach, especially a loss of tone, or weaker action in its muscular fibres; and a morbid condition of the fluids secreted by, or poured into it.

General
effects.

Acidity seems to be common to all its varieties; and this to such a degree that, as Dr. Darwin observes, the contents of the stomach, when regurgitated on a marble hearth, have often been seen to produce an effervescence on it.

Acidity
common to
all the var-
ieties.

The acid, according to the experiments of M. Perperes, is chiefly the acetous, and he has found that not less than two ounces and six drachms of it have been produced by eight ounces of roasted chestnuts, an aliment that ferments in the stomach for an hour and a half; and is even then digested with great difficulty. In some cases the formation of acetous acid seems to

* Bartholin. Hist. Anat. Cent. iii. Hist. 50. Zacchius, Consil. N. 54. 98.

† Eph. Nat. Cur. passim. ‡ Paulini, De Nuce Moschata, sect. iii. p. 3.
Eph. Nat. Cur. Dec. II. Ann. v. app. 71.

§ Bresl. Samml. 1725. i. p. 77. Gronen. Commerc. Liter. Nov. 1733, p. 189.

GEN. V.
SPEC. IV.
Limosis
Cardialgia.
Cardialgy.

be favoured by the nature of the gastric fluid itself, which appears to be secreted in too dilute or weakly a condition for the purposes of digestion; on which account, the food, instead of being converted into chyme, runs readily into a state of fermentation, so that some persons cannot take either honey or sugar without producing this effect: while, in others, the gastric juice itself, when secreted, may possibly contain too large a proportion of the muriatic acid, which, according to the late valuable researches of Dr. Prout, is found in the stomach during digestion.

It is not improbable, that the third variety, *cardialgia sputatoria*, may, in some instances, be produced by inactivity of the proper absorbents of the stomach. The experiments of M. Majendie show that, in a state of health, all fluids disappear from the stomach with great rapidity, in consequence of the urgency of their absorption, inasmuch that a ligature on the pylorus does not in the least retard their vanishing.

Therapeutic
means two-
fold.

First inten-
tion, how
carried into
effect.

In applying to this disease the resources of the art of healing, it is obvious that our intention should be two-fold: to palliate the present distress, and to prevent a recurrence of the paroxysms. The first may be obtained by small doses of opium, and sometimes by other anti-spasmodics, as the ethers and volatile alkali; and where acidity is unquestionable, by calcareous and saponaceous earths. Lime-water, or acidulous alkaline waters, or the different alkalies of the alkalinescent earths, magnesia and lime, have been almost the only ones that have hitherto been employed, or at least the others have not been submitted to a sufficient trial, and under a sufficient variety of modifications, to enable us to speak of them with accuracy. It is a common belief that chalk, with an acid in the stomach, produces an astringent, and magnesia a laxative neutral. This idea is doubted by Dr. Cullen: but it seems to have a foundation, and should regulate our practice. Chalk, however, when used in large quantities, and long persevered in, has an indisputable evil, which does not equally belong to magnesia; and that is, its aptitude to form balls or calculi in some part of the intestinal canal; and thus produce a very troublesome obstruction, and occasionally colic. I have known various instances of this; and, in some cases, attended with alarming symptoms before the balls were dejected; many of which I have also known to be evacuated in masses of more than an ounce weight each. There is no evidence that an acid is found below the duodenum, and hence it is chiefly in the upper part of the alimentary canal that these calculous concretions are impacted and agglutinated. Dr. Parr and some others assert, that an acid formed in the stomach certainly never enters the circulating fluid. It is indeed true, that we have no sensible trace of it in the course of the circulation: but the benefit, which has lately been discovered, and which we shall have occasion to advert to more fully hereafter, of introducing magnesia into the stomach, in habits possessing a tendency to form calculi in the kidneys and bladder from a superabundant secretion of lithic acid, seems to show

Occasional
evil of cal-
careous
earths as
remedies.

Whether an
acid ever
enters into
the circu-
lating fluid.

that an acid principle, or base, still passes from the stomach into the circulation in certain cases, though too minutely divided to be detected by chemical tests; and that the introduction of magnesia into the stomach destroys or neutralizes it at the fountain-head. (See ENTEROLITHUS and LITHIA.) M. Perperes, in taking off acidity from the stomach, unites the calcareous earths with a warm bitter; and recommends, as the medicine he has found most successful, columbo root with magnesia, in doses of ten grains of the former to twelve of the latter.*

GEN. V.
SPEC. IV.
Limosis
Cardialgia.
Cardialgy.

It is observed by Dr. Darwin that, as the saliva swallowed along with our food prevents its fermentation, considerable relief is sometimes derived from frequently chewing parched wheat, mastic, or a lock of wool, and swallowing the saliva thus procured.

Oleaginous preparations have also been had recourse to, and in some habits apparently with success. In such cases, it is most probable, that they act, first, by converting a part of the acid into soap; and next, by proving aperient, and thus accelerating the passage of the acid material into the intestinal canal. The complaint may also be palliated by mucilaginous substances, such as Spanish liquorice, or gum arabic. In many cases, speedy and effectual relief is obtained by the simple and pleasant remedy of eating six or eight almonds.

Oleaginous
remedies.

Yet where we have full proof of acidity as the exciting cause, there are few medicines we can more fully depend upon than soap: probably because in its decomposition it lets loose the oleaginous principle, which may in some degree obtund the pain, and at the same time unites its alkali with the acid of the stomach; thus neutralizing its acrimony, and forming a valuable aperient. "It is often," says Dr. Cullen, "a more convenient remedy than common absorbents or simple alkalies."† If the pain be very severe, we shall much improve the beneficial operation of the soap by combining it with opium. This I have already mentioned as a very valuable medicine in all the varieties of the disease; but it is peculiarly so in water-brash, or the third variety. The distinguished writer I have just quoted asserts, indeed, that he has found nothing but opium that will give it real relief: but this, he afterwards adds, relieves only the present fit, and contributes nothing to the prevention of future attacks.

Operation
of soap.

It is hence necessary, in every case, to direct our view to the second intention I have pointed out; I mean, that of preventing a recurrence of the paroxysm.

Second
curative
intention.

Now, this can only be done effectually by restoring the stomach to its proper tone: and hence, the entire process we shall have to notice under DYSPEPSIA, forming the seventh species of the present genus, will here be found equally advantageous. The warmer bitters, the metallic oxyds, and especially the oxyds of zinc and bismuth, first mentioned by Odier, bid fairest for success. Of the bitters, one of the most elegant, as

* Opera citata, vol. ii.

† Mat. Med. vol. ii. p. 400.

GEN. V.
SPEC. IV.

Limosis
Cardialgia.
Cardialgy.
Nux
vomica.

well as most effectual, is the extract of chamomile. Yet the *matricaria chamomilla*, or dog's chamomile, seems to rival its powers; and has often been found a very active and useful stomachic in most debilities of the stomach. The nux vomica, long since extolled by Linnéus, remains yet to be fairly experimented with in this country. It has the peculiar property of diminishing the sensibility, while it increases the irritability of the animal frame—a property of which I shall speak more at large when discussing the subject of PARALYSIS. It is said to have been given in doses of ten grains three times a day. But this I very much question, where the drug has been sound and genuine. In palsy, I have never been able to raise it above seven grains without making the head stupid and vertiginous.

Terebin-
thinate
balsams.

Among the aromatics, many of the terebinthinate balsams will be found highly useful. The balsam of Gilead, and that of Mecca, *anyris Gileadensis*, and *a. Opobalsamum*, were once highly extolled, and perhaps deservedly; but are too dear for common use. The Turks take eight or ten drops as a dose; but the quantity may be considerably increased. In some of the pharmacopœias, cubebs, as much cheaper, have been ordered instead of the balsams.

The diet should consist of articles least disposed to ferment; as animal food generally, shell-fishes, biscuits; and the drink be, small brandy and water, toast and water, lime-water, or most of the mineral waters.

SPECIES V. Limosis Flatus.—*Flatulency.*

Impaired appetite, with an accumulation of wind in the stomach or intestinal canal; and frequent regurgitation.

Extricated
air, whence
obtained.

It is supposed by Mr. Hunter, that air is occasionally secreted from the mouths of the secretents into certain cavities in which it is found: but, in the present instance, there can be little or no doubt that it is merely separated from the materials introduced into the stomach in the form of food, and tending towards fermentation. When the fluids, which are poured naturally into the stomach, are secreted in a state of health, they concur, and perhaps equally so, in checking fermentation. But when, from imbecility of this organ, or its consociate viscera, they are secreted in a dilute or other imperfect state, they lose their corrective power, fermentation rapidly commences, and the stomach is overloaded, distended, and sometimes ready to burst with the air, for the most part carbonic acid gas, that is hereby let loose; relief being only obtained by frequent *eructation*, or rejection upwards; *crepitation*, or rejection downwards, which the Greeks denominated *βουβος*, as the Latins did *crepitus*; or its combining loosely with such fluids as may exist in the large intestines, where it often rolls about in an ascending or descending direction, according to the action of the dia-

Its effects.

phragm and abdominal muscles; sometimes with a rumbling sound, where the intestinal fluid is but small in quantity, and sometimes, where it is considerable, with a gurgling noise like air rushing into a bottle as the water contained in it is poured out; and hence by the Greeks denominated *borborygmus*. We have, in consequence, the three following varieties, under which this species presents itself to us:

- | | | |
|---|-------------------------|-------------------------------|
| α | Borborygmus. | With frequent rumbling of the |
| | Rumbling of the bowels. | bowels. |
| β | Eructatio. | With frequent rejection up- |
| | Eructation. | wards. |
| γ | Crepitus. | With frequent rejection down- |
| | Dejection of wind. | wards. |

The quantity of air separated in the manner just described is sometimes prodigious, and may amount to an eructation of many hogsheds in an hour. Nor need we be surprised at this; for, by the experiments of Dr. Hales, it appears that a single apple, during fermentation, will give up above six hundred times its bulk of air: while many of the vegetable materials introduced into the stomach possess far more ventosity than apples.

Flatulency, under one or other of the forms now enumerated, is often found as a symptom of other diseases; especially in dyspepsy, cholera, colic, hysteria, and hypochondrias. But there is no doubt that it occasionally exists by itself, and is strictly idiopathic, occurring after the deglutition, and even enjoyment, of a full meal, without any other symptom of indigestion, and ceasing as soon as the process of digestion is completed.

[Flatulency produces various feelings of distress, according to the part of the alimentary canal in which the wind is generated, or pent up. When it is copiously generated in the stomach, and is not expelled by eructation, it gives rise to all the distressing consequences always resulting from great distention of that organ. In some instances, severe pain is excited by the simple extension of its fibres, or their spasmodic contractions. In others, especially in hysterical habits, the adjoining organs are considerably affected by the pressure of the distended stomach; whence great anxiety and oppression are felt in the chest from the impediment to the free motion of the lungs and heart; the respiration becomes laborious and difficult, with a sense of suffocation, and the action of the heart intermits, or violent palpitations occur.

When the bowels are inflated, a sense of uneasiness is experienced, with a rumbling or gurgling noise. Sometimes colic is an attendant on the complaint, and sometimes the whole abdomen is enlarged by the general distention of the intestines with air, accompanied with constipation. When this distention has been of some duration, a degree of paralysis of the muscular fibres of the bowels is produced; their power of expelling the wind is lost; the skin of the belly becomes as

GEN. V.
SPEC. V.
Limosis
Flatus.

Quantity of
air set free
sometimes
enormous.

Symptoma-
tic.

Idiopathic.

General
effects of
flatulence.

GEN. V.
SPEC. V.

Limosis
Flatus.

From the
effect of
cold drinks
on a heated
frame.

Flatulency
in infants.

How re-
medied.

Sense of
belching
flames with
the wind.

Voluntary
distention
employed
as a trick.

Plan of cure.

Emetics,
how far
useful.

tight as the parchment of a drum; and the patient falls into a state of great emaciation. This disease is called *tympanites*.]

A very common cause of flatulence is drinking a large quantity of some cold fluid while the system is labouring under great heat. Another is eating raw vegetables, cucumbers, radishes, salads, &c. or cabbages and other vegetables not duly boiled.

Infants are peculiarly subject to this affection, from the natural delicacy of the stomach, and particularly when brought up without their natural sustenance, and upon food which requires more labour of the stomach to digest. In many cases it must necessarily be combined with acidity; for this, as already observed, is a general effect of impaired action in the chylific viscera: and when both these causes concur, the infant will also be tormented with severe gripings, and great irregularity in the bowels; a distressing and watery diarrhœa; or an obstinate costiveness; and sometimes with both in succession. Essential oils, absorbent powders, and aperients may palliate the symptoms, but the best cure will always be found in a healthy breast of milk.

Hypochondriacs, and others of weak digestive power, are very apt to acquire a habit of eructing; and are perpetually striving to throw up wind from the stomach in an expectation of relieving themselves from the elastic vapour with which they seem to be bursting. It was observed by Dr. Darwin, that when people voluntarily eject carbonic acid gas from their stomach, the fermentation of the aliment is accelerated; just in the same manner as stopping the vessels which contain new wines retards their fermentation, and opening them again quickens it. [This idea, applied to the case of flatulence, may be ingenious; but, probably, it will never persuade a single patient to repress his endeavours to relieve himself by eructations. The reality also of the ill effects of the practice is doubtful.] If cardialgy attend, the air is sometimes eructed with a sense of burning so violent, as to make the patient imagine he is actually, like a volcano, belching forth flames and fire from his entrails.

There are some cases on record, in which persons appear to have a power of distending the stomach and abdomen to an enormous size at pleasure; and advantage has been taken of this by one or two female impostors, who, for particular purposes, have hereby pretended to be pregnant, and have succeeded by such an imposition. But a distention of this kind does not belong to the disease before us.

The cure in this species, as in the last, depends upon giving tone to the muscular fibres of the stomach and intestinal canal; and hence the plan laid down already, and the course to be described under dyspepsia, will have the greatest chance of success.

Emetics have occasionally been recommended, with a view of giving a change to the action of the stomach, but they are of doubtful efficacy. They have been of great service, however, incidentally, by discharging some lurking body which has itself been a chief cause of the disease. In this manner worms have

at times been thrown up; and at times also morsels of indigested fruit or other materials, as plum-stones, or fragments of a pear or apple.*

The disease may be palliated by an innumerable host of carminative plants, which vary in their several effects according to the variety of the idiosyncrasy, or the actual state of the stomach. The verticillate order affords an abundant stock, from which we may select at pleasure; as marjoram, thyme, rosemary, lavender, spear-mint, pepper-mint, and penny-royal; the aroma of all which resides chiefly in the leaves or calices. The coniferous order offers, perhaps, nearly as many, including the terebinthinate and juniper tribes; but of less activity than the preceding, except in the instance of the essential oil of juniper, the pleasantest of all the turpentine family. The medicinal virtue of both these orders is that of camphor, which they all contain very largely, especially the pepper-mint, as shown by the experiments of Gaubius.† The pungency of this plant, however, is so acrid, as to exhaust the sensibility of the nerves of the tongue and palate for a moment, and hence to give a feeling of coldness in succession to that of heat. Its best form is what is called its essence, which, as conjectured by Dr. Cullen, appears to be nothing more than its rectified essential oil dissolved in spirit of wine. On account of the acritude of this plant, it is less valuable, as well as less palatable, than spear-mint; which last acts better, and is more pleasant to the taste when fresh in infusion than when distilled.

The umbellate order affords also a rich variety of carminatives, whose virtue, with a few exceptions, resides almost entirely in their seeds. The aroma of several of these is very pleasant, as the coriander, anise, and dill; while, in a few, as in the fennel, it approaches the nauseous smell and taste of the fetid gums. This, however, is an advantage in flatulencies occurring in hysteric or other nervous habits.

To these may be added many of the aromata imported from hot climates in very different forms; as barks, roots, berries, pods, and seeds, particularly ginger, cloves, cardamoms, cinnamon, pimento, pepper, and capsicum. Like those already noticed, they all owe their virtue to an essential oil, in whatever part of the plant such virtue may reside: but several of them have likewise some other property, which may render them more or less eligible in different cases. Generally speaking, the stimulants we are now contemplating are more strictly entitled to the name of cordials than the umbellate or verticillate plants; for, by exciting the nervous energy in a greater degree, they increase the action of the heart, and quicken the pulse. And hence, when the circulation is weak and languid, they have an advantage over the preceding; but when the pulse is already too frequent, they should be abstained from.

To this general remark, however, there may be one or two exceptions. Newmann and Gaubius, reasoning from the general

GEN. V.
SPEC. V.

Limosis
Flatus.
Carminatives.

Verticillate
carminatives.

Coniferous
carminatives.

Umbellate
carminatives.

Spicy
exotics.

* Riedlin, Lin. Med. ann. iv. v.

† Adversar. passim.

GEN. V.
SPEC. V.
Limosis
Flatus.

Sedative
and hypno-
tic quality
of nutmeg.

use of pepper among the Hindus and Javanese without any particular marks of excitement, have contended that it produces less effect on the sanguiferous system than many other carminatives; but this may be resolved into habit. Dr. Lewis, from some less obvious train of argument, came to a like conclusion in respect to ginger; which to many is as heating as any of the spices whatever. But it seems generally conceded, that nutmeg is entitled to the character of a sedative and even of an hypnotic; and hence, where flatulency is accompanied with great irritability, it becomes peculiarly valuable. Bontius speaks of this influence as a matter of frequent occurrence in the East Indies, and one which had often fallen under his own observation; and in the German Ephemerides* we have an account of some extraordinary effects on the nervous system, occasioned by swallowing a large quantity of this spice. To which I may add the following confirmatory evidence of Dr. Cullen, derived from his own practice. "A person by mistake," says he, "took two drachms or a little more, of powdered nutmeg. He felt it warm in his stomach, without any uneasiness; but, in about an hour after he had taken it, he was seized with a drowsiness, which gradually increased to a complete stupor and insensibility; and not long after he was found fallen from his chair, lying on the floor of his chamber, in the state mentioned. Being laid a-bed, he fell asleep; but waking a little from time to time, he was quite delirious; and he thus continued alternately sleeping and delirious for several hours. By degrees, however, both these symptoms diminished; so that, in about six hours from the time of taking the nutmeg, he was pretty well recovered from both: although he still complained of head-ache and some drowsiness, he slept naturally and quietly through the following night, and next day was quite in his ordinary health."

Probably
possessed
by other
aromatics.

No doubt, this effect was entirely produced by the nutmeg; and it is probable, that several other aromatics, taken in large doses, and much larger than we are in the habit of giving them, might produce a like result. And hence, Dr. Cullen proceeds to caution us against using them very copiously in apoplectic or paralytic cases. Yet, in the affection before us, it is a quality that may often be turned to a very good account.

Oxyde and
nitrate of
bismuth.

Many of the foregoing remedies have often been combined with the oxyde or nitrate of bismuth; and as they have commonly been more successful with such adjuncts than when given alone, these preparations of bismuth itself may be regarded as a useful carminative. They are especially serviceable when the flatulency is chronic, and accompanied with distressing pain.

Before quitting this subject, I will just notice two other remedies for flatulency, because they not only afford benefit at the time, but by their tonic virtue have some tendency to correct the disorder radically.

Aspalathus
canariensis,
or rose-
wood.

The first of these is the tincture of *aspalathus canariensis*, the rose-wood, or Rhodium lignum, of the old writers. This shrub

* Dec. 11. Ann. 11. Obs. 120.

readily yields its fragrant essential oil to rectified spirit; and the tincture is commonly made by macerating four ounces of the wood in a pint of the spirit. It proves a warm, balsamic, and pleasant cordial in doses of from twenty or thirty drops to a drachm.

GEN. V.
SPEC. V.
Limosis
Flatul.

The second remedy I have alluded to is the etherial oil as it is now called, or the *oleum vini*, as it was called formerly, which is found in the residuum of sulphuric ether, and is easily made to float on the surface by the addition of water. It has a strong, penetrant, and aromatic odour, and readily dissolves in alcohol and ether. It is powerfully sedative as well as cordial, and is sufficiently known to be the basis of Hoffman's celebrated anodyne liquor. In the current Pharmacopœia of the London College, this anodyne is imitated in the preparation called compound spirit of ether, the only form in which the etherial oil is employed as an ingredient. For the purpose I am now speaking of, however, it should be dissolved, and in double the quantity contained in the preceding preparation, in the aromatic spirit of ether. [Indeed flatulency admits of being relieved by all stimulant and anti-spasmodic medicines generally, such as assafoetida, the strong smelling gums, ammonia, opium, ether, &c. Together with internal remedies, Dr Darwin applied fomentations to the epigastric region, and Dr. Whytt, stimulating liniments.]

Etherial oil.

Stimulants.

SPECIES VI. *Limosis Emesis.*—*Sickness of the Stomach.*

Rejection of the contents of the Stomach, or tendency to Reject.

A DISPOSITION to regurgitate, or even the act of regurgitation itself, is not necessarily a morbid affection; and to render it such, it must be combined with the symptoms forming the generic character, which, though not specifically repeated, are always supposed to constitute a primary part of the description; and which in the present genus is an "impaired, excessive, or depraved appetite." Thus a regurgitation of food is natural to all grazing quadrupeds, possessing complicated or numerous stomachs, as the sheep and ox; and it constitutes what is called rumination or chewing the cud; the inverted action taking place at the will of the animal, and the food being thrown back from the first stomach, or paunch, into the mouth, for the purpose of further mastication. There are instances of rumination, or a simple voluntary regurgitation of the food into the mouth, among mankind. The German writers upon this subject are numerous, and their collections of cases abundant. But one of the best examples on record is that given by Dr. Slare.* The subject was an adult man, in good general health: the rumination regularly took place about a quarter of an hour after eating, at which time the food felt heavy in the lower end of the œsophagus. If he did not ruminate at the proper time, he soon became languid and sick.

Rejection
alone not
necessarily
a disease.

Instances of
rumination
in man.

* Phil. Trans. vol. xvii. 1690-3.

GEN. V.
SPEC. VI.

Limosis
Emesis.
By what
powers
rejection is
excited.

Experi-
ments of
Hunter and
Magendie.

Magendie's
conclusions
questioned
by Portal.

It is a question that has raised much controversy in the present day, which are the parts chiefly concerned in exciting the stomach to vomit? Haller, and the physiologists of his time, were wont to refer us to the stomach itself. It was the opinion of Mr. John Hunter, that this action is performed alone by the muscles surrounding the stomach, and that the stomach itself is at the time as passive as the lungs in expiration.

For the determination of this point, M. Magendie lately instituted a series of highly curious experiments, of which a brief account has been given in the physiological proem. From these it would appear, that, in nausea, the action is confined to the organ of the stomach alone, or perhaps in conjunction with the œsophagus; that retching is produced by the contraction of the abdominal muscles, and rejection by the contraction of the diaphragm alone, or in conjunction with that of the abdominal muscles; and consequently that an emetic does not cause vomiting by irritating the fibres, or nerves of the stomach, but, as suspected by Mr. J. Hunter, by means of absorption and irritation on the nerves of the muscles that surround the stomach; or rather by the stimulus produced on the brain, instead of on the stomach, and especially transmitted to these muscles.

These experiments, however, have since been called in question by M. Portal, as not conducted with sufficient strictness, and leading to conclusions too generally and too hastily drawn. M. Portal is led to maintain that vomiting commences by a particular action of the stomach, and is then aided and continued by the action of the abdominal muscles, and of the diaphragm: but that, in many cases, this auxiliary assistance is by no means necessary; since, according to his experiments, vomiting may be produced in the stomach when the abdominal parietes have been removed.* And, consistently herewith, Dr. Parr informs us, that the diaphragm "has been wounded, torn, and its apertures enlarged, so as, either by laceration or dilatation, to admit of the passage of the stomach, or a part of the colon into the thorax without any uncommon symptoms."† [In the example of incessant vomiting, recorded by Gondret,‡ where the coats of the stomach were found after death indistinguishably blended together, and converted into a homogeneous scirrhus mass, it may be doubted, whether the organ itself had any share in the rejection of its contents. In the enormous dilatations of the stomach, which sometimes fill the greater part of the abdomen, without any disease or obstruction of the pylorus, some cases and dissections of which are well described by M. Andral, it is easily conceivable, how a slight pressure produced on the stomach by the abdominal muscles, might occasion the frequent vomiting by the partial expulsion of its contents, notwithstanding the paralytic state of its own muscular fibres, the cause to which this author, with great plausibility, ascribed its prodigious dila-

* Mem. de l'Institut Royal de France, Mai 19, 1817. Mémoires sur la Nature et le Traitement de plusieurs Maladies, tom. iv. Paris, 1819. 8vo.

† Dict. Append. p. 101. ‡ Magendie, Journ. de Physiol. Expér. tom. i. p. 230.

tation.* This, however, was a state of disease; and various considerations tend to support the opinion that, under ordinary circumstances, the stomach itself, as well as the muscles of respiration, assists in the expulsion of its contents.]

GEN. V.
SPEC. VI.
Limosis
Emesis.

How
reconciled.

It is not difficult to reconcile these apparently conflicting facts; for such is the close connexion and sympathy that exists between the stomach and its surrounding muscles, that, let the irritation commence in whichever organ it may, it will be instantly propagated to the other. We have the same proofs of sympathy in the stomach, the ileum, the œsophagus, and the fauces. And we can evidently trace the retrogressive action, commencing in different diseases and under different circumstances, sometimes in one of these organs, and sometimes in the other. And we can sometimes moreover see this action limited to a particular part; sometimes running through a certain length of the chain, and sometimes through the whole. The idea of swallowing a nauseous dose of medicine, or an irritation of the fauces by a hair, will often excite a retrograde action in the œsophagus alone: a discharge of wind in cardialgia, or of a small portion of acid, or oil, or any other substance floating on the surface of whatever may be contained in the stomach, seems to excite the fibres of the cardia alone, and they are expelled by its simple and unassisted effort, producing a single act of eructation or belching. The sulphates of zinc and copper, and perhaps all the metallic emetics, act unquestionably upon the fibres of the stomach generally and primarily; and probably all the ipecacuans, whether of the psychotria, the callicocca, or the viola genus, are first absorbents, as asserted by M. Magendie, and then produce vomiting by irritating the fibres of the surrounding muscles. Sea-sickness, and various affections of the head, apparently act in the same manner; and the contractile and inverted action only takes place after a paroxysm of intolerable sinking and languor. In ileus, the retrogressive movement commencing in the bowel which gives rise to the name of this disease, runs with great violence through the whole chain of the alimentary canal; inasmuch that medicines introduced into the rectum are rejected by the mouth. In few words then, "vomiting," to adopt the language of Mr. C. Bell, "is an action of the respiratory muscles, excited by irritation of the stomach;"† or, as we should add, of those muscles themselves.

Different
organs
excited by
different
emetics.

Sickness of the stomach occurs under different forms: the three following are the chief varieties:

- | | |
|----------------|---|
| α Nausea. | Tendency to reject, but without regurgitation. |
| Loathing. | |
| β Vomituritio. | Ineffectual effort to vomit. |
| Retching. | |
| γ Vomitus. | Act of vomiting, or rejecting from the stomach. |
| Vomiting. | |

Sauvages and Linnéus regard the first and third of these vari-

* Op. cit. tom. ii. p. 248. † Experiments on the structure and functions of the nerves. Phil. Trans. 1822, p. 406.

GEN. V.
SPEC. VI.

Limosis
Emesis.

These
varieties not
different
species.

Different
effects pro-
duced on
the system
by nausea
and vomit-
ing.

Nausea,
where
useful.

Vomiting,
where
useful.

eties as distinct genera of disease, and even arrange them as such. This appears highly incorrect: for, if minutely examined, they will be found, in every case, to be little more than different degrees or modifications of the same affection, produced by a greater or less inversion of the peristaltic motion of the stomach and œsophagus, whatever be the cause of such inversion, and allayed or overcome by the very same means. Where the stimulus, and consequently the degree of inversion, is light, the effect is confined to nausea; if beyond this, the nausea becomes retching; and then the retching becomes vomiting. They may, indeed, exist separately; for the cause may be of a kind or strength sufficient to throw the stomach at once into a state of violent inversion, and consequently to produce vomiting without the common intermediate changes; as in the case of various metallic emetics, sympathetic irritation from pregnancy, or the swallowing putrid vapour. While, on the contrary, minute doses of squills, or ipecacuan, or any other cause that produces but a slight degree of action, will excite nothing more than nausea, or the first stage alone of the inverted action upon which the general affection depends.

It is nevertheless curious, and of great importance, to observe the different and opposite effects produced on the animal frame by these two stages of one and the same disease. Nausea lowers the pulse, contracts the small vessels, occasions cold perspiration, severe rigors, and trembling, and diminishes, as long as it lasts, the action and even the general powers of life. The act of vomiting, on the contrary, rouses rather than depresses; puts to flight all the preceding symptoms, and restores the system to itself. There are few persons so debilitated as not to bear vomiting, but many who would sink under nausea. It is obvious, therefore, that these two different states of the stomach may be employed as powerful instruments in attacking a variety of general, and even of remote local diseases; this organ being justly considered as the common centre of sympathy, and producing opposite results, according as it is excited to different modes or degrees of action. As nausea diminishes the action of the system generally, and particularly that of the small vessels, it has been often had recourse to with success in inflammation of various organs, particularly of the eyes and lungs; as it has also on the approach of the first fit of intermitting fevers, or the accession of those of a continued type, and that threaten a considerable degree of violence. Full vomiting, by augmenting the general action, and consequently giving great additional energy to the absorbent system, has also been very advantageously employed to remove inflammation, though in a different manner; and particularly inflammation of the suppurative kind. Orchitis and purulent ophthalmia have often yielded to it as a charm; and we have various instances, in which the fluid of extensive abscesses has been hereby carried off in a few hours. From the pressive violence of the action, it has also been highly beneficial in many cases of obstruction, or chronic torpitude: and hence its occasional utility in amaurosis and caligo; and

still more so in congestions of the liver, and other abdominal viscera.

As different emetics, however, produce not only a different action on the stomach, but also on the system at large, or different parts of it, they are by no means to be used indiscriminately, but in reference to the particular object we have in view. This difference of effect depends upon the peculiarity of their *emetine*, as the French writers denominate it, or emetic principle, of which we require farther instruction than has been obtained at present; though the experiments of MM. Magendie and Pelletier have given us some information concerning this principle, as it exists in the brown ipecacuan (*psychotria emetica*), the gray (*callicocca Ipecacuanha*), and the white (*viola emetica*).

The ipecacuans, however, though possessing some diversities of power, concur in operating very generally upon the skin, at the same time that they excite the stomach; increasing, in a slight degree, the discharge of mucus from the lungs, and adding a little to the peristaltic motion of the bowels. The antimonial emetics, in a full dose, act more violently upon the stomach, bowels, and skin, but less upon the mucous secretions. While in small doses, the nausea they produce is accompanied with the most deadly languor, and with an atony, that, in numerous cases, has been succeeded with more mischief than any degree of benefit that could have been proposed by their use: "Many in this manner," says Dr. Perceval, of Dublin, in his manuscript remarks on the volume of Nosology, "have sunk under the nauseating doses of emetic tartar, employed upon the hypothesis of Dr. Cullen, in low fevers. The heart of a frog is so torpedied by this antimonial, as not to be excited by galvanism, which is not the case with opium. The fraction of a grain of tartar-emetic, in a gouty habit, subject to melæna and palpitation, produced an alarming deliquium. In the same subject, a similar effect attended the use of other antimonials."

The squill and seneka root act very generally; proving not only emetics, but cathartics and expectorants. The asarum, which was once extensively employed for vomiting, both in its root and leaves, at the same time that it inverts the stomach, acts powerfully on the olfactory nerves, and becomes a pungent emetic. It is hence by far the best emetic we can select in affections of the eyes, and several species of cephalæa. Hot water operates only as a simple stimulant to the stomach; and hence, unless there be other irritants in its cavity, rarely takes effect till the stomach becomes distended, and the nervous fibres of the pylorus are inordinately excited by the quantity swallowed. If, however, we infuse in the hot water a certain portion of horse-radish, mustard-seed, the root of mezereon, or a handful of chamomile flowers, we increase its stimulant power, and a much smaller quantity is sufficient. And it is probable that all these substances act, in like manner, as simple stimulants alone; for, in small doses, they tend rather to take off than to excite sickness. There is little doubt that air acts in the same

GEN. V.

SPEC. VI.

Limosis

Emesis.

Different effects of vegetable emetics derived from the difference of their emetine.

Ipecacuans.

Compared with antimonial emetics.

Squill and seneka.

Asarum, its peculiar use.

Hot water.

Power increased by adding simple stimulants, as horse-radish, &c.

Air.

GEN. V.
SPEO. VI.
Limosis
Emesis.
Metalline
emetics.

Alkaline
salts.

Nitrate of
potash.

Prussic
acid.

Mode of
action.

Symptoms
excited.

way : for some persons, as Mr. Goss, of Geneva, by swallowing and distending their stomach with air, are at any time able to discharge its contents. The sulphates of zinc and copper, and the more powerful preparations of antimony, are probably simple stimulants also, but of a high degree of activity. They act on the stomach almost as soon as they are introduced ; and hence are peculiarly eligible for a rapid expulsion of poisons that have been taken inadvertently. If taken, however, in too large a dose, they become quite as mischievous as any poison they are intended to remove ; for they prove violently corrosive to the coats of the stomach, and excite hæmatemesis, or vomiting of blood. There are some of the alkaline salts that act in the same manner when taken in excess, and throw not only the stomach, but other parts of the system, into violent spasmodic motions. Two ounces of nitre were taken, by mistake, for one ounce of Epsom salts. An almost incessant vomiting for two days was the result, accompanied with a copious discharge of grumous blood from the excoriated mucous membrane of the stomach ; notwithstanding that very large quantities of warm water were repeatedly drunk, and alternated with equal quantities of gruel and mucilage of gum-arabic, to defend the surface of the stomach by an artificial mucilage. Mr. Buller, who relates this case, informs us, that the patient recovered, but was long afterwards subject to chronic spasms, resembling chorea.*

Many of the concentrated acids act in the same manner as the alkaline salts : and some far more generally and extensively, especially the Prussic acid, which exhausts the whole nervous system, almost like a stroke of lightning, at the same time that the stomach is burnt up.

1. When introduced into the stomach in *large doses*, and *highly concentrated*, it irritates or corrodes it, by dissolving the gelatin of its coats, and death takes place by a sympathetic injury of the nervous system.

2. When diluted, it acts neither by irritation nor sympathy, but by absorption, operating on distant organs : and, *cæteris paribus*, it acts much more rapidly when diluted than when concentrated.

3. It is very difficult of detection when absorbed in any of the fluids, being probably decomposed in passing through the lungs, and its elements combining with the blood.

4. It is a direct sedative. The organs it acts upon through absorption are the spine and brain primarily, and the lungs and heart secondarily : and the immediate cause of death is sometimes paralysis of the heart, sometimes slow asphyxy, and sometimes a combination of both.

The first symptom it produces in the stomach is an instant burning pain, often also existing in the throat : violent vomiting generally follows : the matter discharged is commonly dark, chocolate-hued, and sanguinolent. The bowels are little affected : the pulse is very feeble, almost imperceptible, with cold

* Edin. Med. and Surg. Journ. No. 53. p. 34.

clammy sweats, and lividity of the nails and fingers. The stomach, on examination, generally contains a quantity of the material vomited, being extravasated blood, altered by the poison as in the case of other acids.

GEN. V.
SPEC. VI.
Limosis
Emesis.

In attacking this poison, a rapid and natural vomiting is advantageous, by removing a part of the material: but diluting it assists in promoting its absorption, and rendering it more mischievous. The oxalates of the proper alkalies, ammonia and potash, are as dangerous nearly as the acid itself, and hence alkalies must not be used; but the alkaline earths, chalk and magnesia, make insoluble compounds, and afford immediate relief: they should be used with the most powerful stimulants.*

Remedial
process.

The ipecacuans, and indeed most of the preceding emetics, excite vomiting as effectually by being introduced into the blood-vessels, and consequently exciting the abdominal muscles through the medium of the brain, as by being conveyed into the stomach. But there are some articles of the *Materia Medica* that will produce this effect on being applied to the surface of the epigastric region, or the hypochondria alone; as the oil of croton, tobacco, and what we should far less expect to possess such activity, the leaves of groundsel beat up into a cataplasm. Mr. Stedman, of Kincross, who, I believe, first published an account of this power in both plants, availed himself of it as a remedy for agues, and parabysmic tumours of the liver.†

Tobacco
applied
to the
stomach.

Groundsel
applied
to the
stomach.

As the stomach is the common centre of sympathy, it is not to be wondered at, that nausea or sickness should be a symptom common to a variety of diseases seated in organs more or less remote from itself. And hence we find it occurring in colic, cholera, stone, the accessions of fevers, repelled gout, and various affections of the head.

Sickness
from sym-
pathy;

The last is, indeed, a very frequent, perhaps the most frequent, of all the sympathetic causes whatever; for nothing can disturb the regularity of the sensorial function without disturbing the stomach; and hence sickness is sure to follow oppression of the brain, whether produced internally, by hanging, drowning, or apoplexy: or externally, by a fracture of the cranium accompanied with depression. A severe jar of the brain, as in the case of concussion, even without extravasation, is certain of exciting the same effect. Nay, any slighter motion to which the head has not been accustomed, as that of moving it rapidly from shoulder to shoulder in a half rotatory direction, accomplishes the same purpose. And hence we see the reason of the vomiting induced by running, or riding a horse round a small circle: by the action of swinging, of riding backward in a coach; and all the languor and deep regurgitation of seasickness. The living frame, however, has a most wonderful instinctive power of accommodating itself to circumstances: and hence, by habit, we are enabled to undergo the new mo-

from affec-
tions of the
head.

From affec-
tions of the
head.

Hence from
swinging,
&c.
Sea-sick-
ness.
Ceases by
use.

* Experimental Inquiry on Poisoning by Oxalic Acid. By Robert Christison, M.D. and Charles W. Coindet, M.D. Edin. Med. and Surg. Journ. Apr. 1823.

† Edin. Med. Essays, vol. ii. art. v. 295.

GEN. V.
SPEC. VI.

Limo-is
Emesis.
Singular in-
stances of
accommo-
dation.

tion without any inconvenience to the sensorium, and consequently without any sickness of the stomach. And this power of accommodation is so considerable that we have numerous instances of extensive depressions, and even of bullets and other foreign substances lodged in the brain, which, though at first productive not only of incessant sickness, but of the most dangerous symptoms of compression, have by habit been borne without any evil to this organ; and hence also without any disquiet to the stomach.

To produce
sickness, the
brain must
possess
some degree
of excita-
bility.

In all these cases, however, the brain must still retain a certain degree of excitability: for if this be entirely or very nearly lost, neither the muscles surrounding the stomach, nor even the stomach itself, possess energy enough to produce an inversion of this organ. Hence, in an extreme state of apoplexy, or asphyxy, there is no vomiting whatever, nor is it possible to excite it in the profuse and sudden exhaustion of the nervous power which follows upon swallowing large doses of the *atropa belladonna*, and various other narcotics; in combating the effects of which fourteen grains of tartarized antimony have been administered to no purpose. "Now, if in such a case," says Dr. Paris, "a copious draught of some vegetable acid be given, the emetic will be more likely to succeed." And agreeably with the principles just laid down, "here then," says he, "we perceive that the brain, being paralyzed by a narcotic poison, is unable to lend its aid to the muscles requisite for the operation of vomiting, until its energies are restored by the anti-narcotic powers of a vegetable acid."*

Treatment
to vary ac-
cording to
the cause.

In an affection resulting from such an infinite variety of causes, no one remedy or even plan of treatment can apply generally. Sympathetic sickness can only be radically removed by removing the idiopathic disease upon which it is dependent, though it may often be mitigated when very distressing, and the primary disorder is likely to be of long standing. The best palliatives in most cases of this kind will be found in carbonic acid air; the saline draught, as it is called, in a state of effervescence, whether made with lemon juice, or, as first proposed by Riverius, with sulphuric acid; the more grateful carminatives; and small doses of opium. When the stomach is overloaded, or irritated by bile or any other material that sits uneasily, the offending matter must be first discharged, and then the stomach restored to its proper tone and action by some aromatic cordial, or if necessary by narcotics. Food should at first be given in the smallest quantity and of the lightest kind. A little toast and water alone, taken in small sippings, or a small spoonful of brandy and water, with a single morsel of sopped biscuit, will often sit easy when nothing else will remain; and gradually solicit the stomach to a healthful re-action. Stimulant cataplasms applied to the epigastrium are also frequently serviceable.

When the sickness proceeds from a chronic debility of this

* Pharmacologia, p. 152, 5th edit. 1822.

organ, the lighter and warmer bitters, as the infusion of orange-peel, cascarilla, or columbo; or, where a more active stimulant is necessary, that of leopard's bane (*arnica montana*) may be found useful. The cinchona [except in the form of the sulphate of quinine dissolved in the compound infusion of roses] rarely agrees with the stomach. The oxydes of zinc and bismuth are frequently useful. Sea-sickness is only to be cured by habit: yet it has often been rendered less distressing by small quantities of brandy, the aromatic spirit of ammonia, or laudanum.

GEN. V.
SPEC. VI.
Limosis
Emesis.

[Vomiting is frequently only a symptom of disease of the stomach itself. This is the case in chronic inflammation of the organ, in scirrhus of the pylorus, and in ulceration of the mucous coat. When the latter membrane is either ulcerated, or merely weakened by any previous morbid change, the effort of vomiting sometimes occasions a laceration of the other coats of the stomach, and a fatal effusion of its contents in the abdomen is the immediate result.*

SPECIES VII. Limosis Dyspepsia.—Indigestion.

The appetite fastidious; the food digested with difficulty; habitual costiveness.

THIS is by far the most complicated of all the disorders belonging to the present genus. The three preceding species may often be traced by themselves, or in a state of separate existence. Dyspepsy may be regarded as consisting in a combination of their respective symptoms irregularly intermixed; sometimes one set of symptoms taking the lead, and sometimes another; with a peculiar tendency to costive bowels, and especially that species of costiveness which we shall hereafter have occasion to denominate *coprostasis obstipata*, dependant on a weakly temperament or a sedentary habit, and in which the discharged feces, instead of being congestive and voluminous, are hard, slender, and often scybalous.

Dyspepsy, therefore, in the language of Dr. Cullen, may be described as "a want of appetite, a squeamishness, sometimes a vomiting, sudden and transient distentions of the stomach, eructations of various kinds, heart-burn, pains in the region of the stomach, and a bound belly." Yet none of these are uniformly present, and all of them seldom. So that, as already observed, the symptoms of cardialgia, flatus, and emesis, with a few others, enter in irregular modifications into dyspepsia, as those of dyspepsia enter into hypochondrias. [In the opinion of Dr. Armstrong, the most constant symptoms of dyspepsia are a furred tongue, flatulence of the stomach, and fretfulness, or depression of spirits. They may arise primarily from disorder or disease in the stomach itself; or they may depend upon an af-

Symptoms
complex
and often
shifting.

* See J. N. Weekes on rupture of the stomach, in Med. Chir. Trans. vol. xiv. Lallemand, art. RUPTURE, in Dict. des Sciences Médicales.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Gravel often
a symptom,
or sequel.

fection of the brain, liver, bowels, or some other remote or adjacent part.* The necessity of a careful discrimination of the original affection by the practitioner is quite manifest.]

There is also another complaint, which frequently enters into the multiform combination of maladies, of which dyspepsy is the general expression, and which has rarely been noticed by writers, although it is often a very troublesome symptom, and that is gravel. In treating of gravel or lithia, as an idiopathic affection, we shall have to notice, that one of its chief and most common causes is an excess of acidity in the primæ viæ; and, as such excess is almost constantly to be found in dyspepsy, gravel must frequently attend or follow, and is even a necessary effect where there exists what has been called a calculous diathesis. And for a like reason, where there is a podagric diathesis, gout in some form or other is a frequent concomitant.

Sometimes
gout.

Common
proximate
cause.

The grand proximate cause of the three preceding species is debility of the stomach, whence, among other evils, an impaired secretion of gastric fluid. In the present instance, the debility is not often confined to the stomach, but extends to the intestinal canal, and the collatitious viscera, as the mesentery, the spleen, and the pancreas, especially the liver, in which it most frequently commences; and hence another cause of the great complexity of this disease.

Proof of
debility in
the intestinal
canal.

The debility, and indeed torpidity, of the intestinal canal is evident from the habitual costiveness, which so peculiarly characterizes this affection. Whether this be direct or indirect, intrinsic or sympathetic, as harmonizing with the weakness of the stomach, it is not easy to determine: but nothing can be a stronger proof of the great inactivity of the intestinal tube, from whatever cause produced, than the feebleness of its peristaltic motion, notwithstanding the acrimonious matters that are so frequently diffused over its inner surface.

Proof of
imbecile
action in
the liver;

The imbecility of the liver is equally obvious in most cases, from the small quantity of bile that seems to be secreted, or its altered and morbid hue, as evinced by the colour of the fæces, which, in some instances, are of an unduly dark, and in others of an unduly light tint; and possibly from the inactivity of the intestines themselves, whose peristaltic motion is conceived by Dr. Saunders and other pathologists to be, in a great measure, kept up by its stimulus.

in the me-
sentry;

When the mesentery is affected, the chyme is generally obstructed in its passage to the thoracic duct, and the general frame, deprived of its needful nutrition, becomes flaccid and emaciated; and, from a collapse of the minute vessels on the surface, assumes a wan or sallow complexion.

in the pan-
creas and
spleen.

It is highly probable that the pancreas and spleen are both also affected in many cases of dyspepsia. Of the actual part taken by either in the process of digestion, we have already had occasion to observe that we know but little: but we do know that the pancreas pours forth a considerable portion of the fluid

* See Armstrong's Morbid Anat. of the Stomach, &c. p. 68.

which holds the solid part of our aliment in solution : while in most of the cases of dyspepsy, brought on by a habit of drinking spirituous liquors, the spleen is evidently affected as well as the liver.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

It is in this state of the disease that we frequently meet with that tenderness or other uneasiness in the epigastric region, and that peculiar hardness of the pulse, often accompanied by febrile symptoms, which Dr. Wilson Philip has pointed out as pathognomic of what he calls a second stage of the disease.*

Second state
of the
disease.

It has also been well observed by Dr. Philip, that the lungs are, in many instances, apt to associate in the morbid action of the digestive organs, when it has become chronic, and to produce, as a result, a peculiar variety (with him *species*) of consumption, to which he has given the name of dyspeptic phthisis.† The dyspeptic character of the disease, however, and especially the hepatic symptoms, together with those of lowness of spirits, flatulency, and other hypochondriacal affections, rarely fail to accompany it when complicated with phthisis, and point out its real source ; and the cure must be chiefly directed to the primary malady, how much soever the induced symptoms may also demand our attention : for it will be in vain to subdue the latter while the former is still suffered to bear sway.

Catenation
of the lungs
with the
digestive
organs.

It must nevertheless be admitted, that in some instances the secondary disease seems to afford relief to the primary, and that the organ first affected recovers its health in proportion as that subsequently affected yields to the attack ; in the same manner as in erysipelas and the migratory forms of herpes, the eruption travels forward, the part relinquished heals, and fresh parts are affected in succession. In all such cases, the secondary complaint becomes a new malady, and must often be followed up under another principle and another mode of treatment. And not unfrequently we can very advantageously take a lesson from this peculiar march of nature ; and by exciting an artificial irritation in some neighbouring and less vital part, can draw off the morbid action into such quarter. It is by this means that blisters, setons, and other counter-irritants are so frequently found productive of the best advantage. And as a disease of the alimentary canal is thus sometimes communicated or transferred to the lungs, so a morbid state of the lungs is sometimes extended to the stomach, of which Dr. Gardiner has lately furnished us with a striking example.‡

Primary
disease
sometimes
relieved by
secondary.

This affec-
tion be-
comes a
new ma-
lady.

In chronic inflammation of the stomach, and even in that form of it which terminates in ulceration of the organ, and a fatal effusion of its contents in the abdomen,§ we also meet with several, and sometimes all the symptoms of dyspepsy ; but as dyspepsy occurs here merely as a secondary or induced affection,

* Treatise on Indigestion, &c. p. 41. 8vo. London, 1824. † Id. p. 323.

‡ Transact. of the Medico-Chir. Soc. of Edinburgh, vol. i. 8vo. 1824.

§ See Abercrombie on the pathology of the stomach, &c. in Edinb. Med. and Surgical Journ. No. 78 ; Elliotson's case of ruptured stomach, in Med. Chir. Trans. vol. xiii. p. 31 ; also Louis, in Archives Gén. de Méd. tom. v.

GEN. V. it will be more regular to examine the nature and effects of this
SPEC. VII. cause hereafter.*

Limosis Under whatever form, and from whatever cause the disease
Dyspepsia. occurs, there is a considerable degree of general languor and
General debility. Exercise or exertion of any kind soon fatigues; the
languor and pulse is weak; the sleep disturbed; the extremities are cold,
debility. or rendered so on slight occasions; and the tongue for the most
part is furred or covered with a creamy mucus in the morning.
Yet this last symptom is not always to be depended upon; for it
is sometimes wanting in the disease, and sometimes common to
those who have no such disease whatever, and are in the enjoy-
ment of habitual health.

Collatitious That dyspepsy should be connected with a morbid condition
viscera con- of any of the adjoining organs, is by no means difficult to con-
cerned in ceive, when we reflect that they are all concerned, directly or
the digest- indirectly, in completing the great object of the digestive pro-
ive process. cess, which is that of furnishing a constant supply of nutrition
for the system at large. Digestion is commonly supposed to
take place in the stomach alone; but this is an erroneous view,
though the stomach may be regarded as the chief link in the
great associate chain. In the stomach, as we have already seen
in the proem to the present class, the food is only broken down
into the pulraceous mass called chyme, and thus converted into
the mixed principles of oil, gelatine, and sugar, and little else;
for though we have some traces of animalization, they are ru-
diments and nothing more. Yet this, which is the first, is the
most important stage of digestion; and its perfection depends
upon the vital power. Where this is small or enfeebled, the
process of chymification is necessarily impaired or interrupted:
the wonderful machinery of the stomach, which finds no paral-
lel, not only without the body, but in any other part of it, is dis-
turbed or impeded in its operation; and its fluids are poured
forth too sparingly or too inconditely.

Part per-
formed by
the sto-
mach.
Chyme.

Chyle.

The next stage of the digestive process takes place in the
duodenum, which easily admits of distention, and receives the
food in the form of chyme from the stomach. Here the bile,
the most highly animalized of all the secretions, and abundance
of the pancreatic juice, meet it, and a new play of affinities
commences; the bile, as supposed by Fourcroy, being separated
into two parts, its saline principles and its resin. The latter is
discharged with, and gives a colouring matter to, the excre-
ments; the former become decomposed, attenuate the chyme,
communicate their azote, and thus complete its animalization;
while the juice of the pancreas dilutes and holds the material
in solution, and probably contributes to some other effect, but
which has not yet been detected. In this liquid state it is called
chyle. The recrementory part, which descends into the larger
intestines, is attacked, as it proceeds, by the mouths of a con-
siderable number of lacteals, that drink up whatever small quan-
tity of the chyle may be accidentally intermixed with it; while

* Vol. ii. Cl. iii. Ord. ii. Gen. vii. Spec. xi.

the great body of this fluid is absorbed in the duodenum itself, by an innumerable host of the same vessels which concentrate their mouths on its inner surface.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia,

We thus see how largely the digestive process ranges, and from what a wide spread of organs, closely sympathizing with each other, the disease of dyspepsy may proceed. But the finishing touch still remains to be added: the absorbed chyle, before it becomes completely assimilated, has to be exposed to the action of the atmosphere, and for this purpose has to travel to the lungs. What change it sustains in consequence of this exposure, will be the subject of a subsequent enquiry. At present it is sufficient to show the connexion which subsists between the stomach and the lungs in the common function of providing for the sustenance of the animal machine; and to indicate the means, by which a morbid action of the former may be communicated to, or lay a foundation for impaired action in, the latter; since, to say nothing of the sympathy of approximation, or of that sympathetic influence which is always found to take place between the extreme links of a chain that runs through any part of the animal machine, it must be obvious that if the chyle, which originates in the stomach, and when in a state of health, communicates a peculiar stimulus to the lungs, as it enters their substance in combination with the recurrent and exhausted blood, should be conveyed to them in an unhealthy condition, this peculiar stimulus may be changed in its mode or degree of action, and the lungs in consequence become a sufferer; more especially where they are predisposed to any kind of morbid action. And hence another origin of dyspeptic phthisis, which, like every other modification of the disease, may depend, therefore, upon imbecility of one or more of the digestive organs.

Chyle yet to be operated upon by ventilation.

Hence close connexion between the stomach and the lungs.

Whence dyspeptic phthisis.

The common causes of this imbecility, whether confined to the stomach, or co-extensive with the associate viscera, may be contemplated under two heads, *local* and *general*: under both which they are still farther resolvable into the two opposite extremes of deficient and excessive stimulation; and consequently into a divergency of any kind from that medium of excitement and activity upon which health is made to depend.

Causes of dyspepsy local and general.

The local remote causes are, a too large indulgence in sedative and diluting substances; as tea, coffee, and warm water, or similar liquids taken as a beverage; or an equal indulgence in stimulant and acrid materials, as ardent spirits, spices, acids, tobacco whether smoked or chewed, snuffs, a daily habit of distending the stomach by hard eating or drinking; or a rigid abstemiousness, and very protracted periods of fasting.

Local remote causes.

The general remote causes are, an indolent or sedentary life, in which no exercise is afforded to the muscular fibres or mental faculties. Or, on the other hand, habitual exhaustion from intense study, not properly alternated with cheerful conversation; becoming a prey to the violent passions, and especially those of the depressing kind, as fear, grief, deep anxiety, immoderate libidinous indulgence; and a life of too great muscu-

General remote causes.

GEN. V. lar exertion. Perhaps the most common of this latter class of
SPEC. VII. causes, are late hours and the use of spirituous liquors.
Limosis Dyspepsia. Dyspepsia is hence presented to us under several varieties,
of which the two following are the chief:

- | | |
|---|--|
| <p>α Organica. Organic indigestion.</p> <p>β Enervis. Enervate indigestion.</p> | <p>Originating in the digestive organs and principally confined to them.</p> <p>Originating in a relaxed state of the constitution from causes acting generally.</p> |
|---|--|

For both these, the general principles that should govern us in attempting a cure are the same, though the means of carrying such principles into effect will admit of diversity.

Medical treatment.

Under what shape soever the disease may present itself, the first thing to be enjoined is a relinquishment of whatever cause has laid the foundation for it: we must next palliate the symptoms that aggravate and continue the disease; and, lastly, we must restore the debilitated organs to their proper tone; or, in other words, we must correct or remove what is called, though not very precisely, the proximate cause of the malady.

First intention, an abandonment of whatever may have been the remote cause.

The patient must, in the first place, be convinced of the necessity of putting himself under a new rule of conduct, and be deeply impressed with the idea, that though he may have continued his late plan of life for a considerable period of time without having sensibly suffered for it, yet now that he is suffering, nothing but his conforming to another plan will remove his present complaint.

Exercise and cheerful conversation.

Severe and long continued study, protracted, as I have often known it, through ten hours a-day for many months, without any relaxation or interchange of pursuit, must give way to the exercise of walking or riding, and this not occasionally, but daily; and to the still better cordial of cheerful conversation. The last is of very great importance; and without it even exercise itself will be of little avail: for the mind, accustomed to a certain track of intellectual labour, will otherwise relapse, even while riding or walking, into the same habitual course, be dead to the most fascinating prospects around it, and become exhausted by its own abstraction. And it is to characters of this kind, perhaps, more than to any other, that the amusements of a watering-place promise ample success; where the general bustle and hilarity, and the voluntary forgetfulness of care, the novelty of new scenes, and new faces, and new family anecdotes, and the perpetual routine of engagements that fill up the time with what would otherwise be trifles and frivolities, reverse the mischievous order and monotony of the past, break the sturdy chain of habit and association, and give leisure to the worn-out sensory to refresh itself.

Where the same effect has proceeded from a town-life of fashionable follies and dissipation, nothing is more common than to recommend a like change of residence. But in this case, though it may be a change of residence, it is not a change of

life; and hence it is too often made without any benefit whatever. A total retreat from the world, the unbroken seclusion of a remote hamlet, the sober society of a few intimate friends, simple meals and early hours; instead of close and heated rooms, crowded and motley routs, costly feasts, and midnight madrigals, are what are specially called for in this instance, but are not always to be met with in the resort of a watering-place. In such as are still distinguished for their quiet and unfrequented shores, where all is rude and simple, and spruce squares and long-drawn parades have not yet put to flight the scattered and irregular cottages of former times, these advantages may still be obtained. But it is rarely that patients, who are suffering from a life of dissipation, will consent to relinquish the higher attractions of our gayer and more public retreats, for what they are apt to esteem the dulness of an unfrequented coast, till it is of little importance whether they go any where, or remain at their own homes.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
For the dissipated, a retreat from fashionable life.

In like manner, the habitual use of hard eating and drinking must give way to a wholesome plainness of diet; though I am afraid, that not a little mischief has often ensued from rigidly compelling the man who is suffering from a long habit of the former, to abandon this habit at once, and run to an extreme of abstemiousness. Nothing can be more injurious. Even in full health, the animal frame, though it may be brought to any extreme by degrees, very ill brooks abrupt changes; and I have often seen where such changes have been attempted in an enfeebled constitution, that they have introduced worse complaints than they have been intended to remove. The use of tobacco is not, in our own day, employed very often to such excess, whether in smoking or chewing, as to become a very alarming cause of dyspepsy: but I have known instances where the former has been suspected, though perhaps unjustly, of having been the cause of this complaint, and where an abrupt prohibition of its entire use has introduced a dangerous atrophy.

For the free liver, plain fare and early hours.

But sudden and extreme changes mischievous.

It is certain, however, that a free use of tobacco under either or any form has produced very severe dyspeptic affections, and consequently, in such cases, it ought to be relinquished by degrees. Nor is it difficult to conceive by what means tobacco thus acts; for, like opium, it is a stimulant readily producing a narcotic effect, or, in other words, rapidly exhausting the sensorial power. In chewing, a considerable portion of tobacco is conveyed to the stomach along with the saliva: in smoking, a somewhat smaller quantity is conveyed in the same manner; and, in both, the salivary glands are excited to a great waste of secretion; which cannot take place without impairing the chymifactive process indirectly, as the introduction of the tobacco into the stomach impairs it more immediately. The areca, or Malabar nut, though a good bitter, when chewed for a long time is well known to impair it in the same manner. Even in the form of snuff, tobacco has not unfrequently been found to produce the same result; partly perhaps from the paresis of the olfactory nerves, in which the stomach participates by

How far the use of tobacco is a cause.

Areca, or Malabar nut.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Snuffing.

sympathy, and partly from the portion of tobacco that is constantly passing into it from the nostrils. "I have found," says Dr. Cullen, "all the symptoms of dyspepsia produced by snuffing, and particularly pains of the stomach occurring every day. The dependance of these upon the use of snuff became very evident from hence, that, upon an accidental interruption of snuffing for some days, these pains did not occur; but upon a return to snuffing the pains also recurred; and this alternation of pains of the stomach and of snuffing having occurred again, the snuff was entirely laid aside, and the pains did not occur for many months afterwards, nor, so far as I know, for the rest of life."*

Case in
which it
took off the
appetite;

Dr. Cullen tells us in another place, in proof of the same fact, but in proof also that the habit is sometimes variable in its influence, that he knew a lady, who had been for more than twenty years accustomed to take snuff, and that at every time of day; but who came at length to observe that snuffing a good deal before dinner took away her appetite; and that even a single pinch taken at any time in the morning, destroyed almost entirely her relish for that meal. When however she abstained entirely from snuff before dinner, her appetite continued as usual; and after dinner, for the rest of the day, she took snuff pretty freely without any inconvenience.†

accounted
for.

This singularity may partly have depended, as Dr. Cullen supposes, on the inequality of the power of habit in exerting its effects: but it most probably depended also upon some peculiar change in the stomach at the time; apparently on an increased irritability which made it more susceptible, in an empty state, to the nauseating quality which tobacco possesses in common with many other narcotics.

Stomach
often capri-
cious, but
whatever
disagrees
with it to be
avoided.

Not in manner of life alone, but in manner of food, should we rigidly proscribe whatever we find to be a cause of indigestion. And hence dyspeptic patients should pay a particular attention to themselves, so as to discriminate between the viands that sit easy on the stomach and those that render them uncomfortable: for nothing in a morbid state is more capricious than this organ, and twenty different cases may perhaps demand as many varieties of regimen. Thus tea of all kinds, and especially green tea, is generally accounted a narcotic. Dr. Smith and Dr. Lettsom endeavoured to trace up its narcotic principle by experiments, and, it is to this principle that Dr. Cullen ascribes the deleterious effects it produces upon some stomachs. Yet while it acts as a narcotic upon many persons, upon others, and myself among the rest, it proves powerfully agrypnic; and if taken on going to bed, keeps up wakefulness through a great part of the night.

Tea narcot-
ic to some;
agrypnic to
others.

Second in-
tention, to
palliate the
symptoms.

We must first then prohibit, in our endeavours to effect a cure, whatever we know to be a local or general cause of the

* Mat. Med. vol. ii. p. 275.

† Op. citat. p. 274.

disease. Our next intention should be to palliate the symptoms that aggravate and continue it.

As the stomach is often overloaded with crudities and acidity, Dr. Cullen recommends an emetic at the outset. I have rarely found this of use: it often adds to the debility of the stomach; and at most is only of service for a few hours. For so long as the cause continues by which an accumulation of undue materials is produced, this effect will be perpetually taking place, and an emetic might be necessary every day. The most rational mode of prevention is, to limit the stomach to such food as it will most easily digest; to allow it in small quantities; to quicken its removal by gentle aperients that may increase the peristaltic action, and warm tonics that may invigorate the digestive organs. A spare diet, however, though often recommended, is rarely found of service, and very generally adds to the disease: for as the stomach and bowels have been accustomed to the stimulus of food, and a certain degree of impletion, if this be not maintained, the atony will be increased, the natural function still farther impaired, and all the symptoms of uneasiness be aggravated. A moderate proportion of excitement and impletion is hence imperiously called for; and our discretion is principally to be exerted in determining the nature of the viands and the degree of impletion which will best agree with the stomach, and which it may most easily master.

For the correction of flatulency, most of the carminatives noticed under the fifth species of this genus may be conveniently had recourse to; and for that of acidity, limewater, the acidulous alkaline waters, the alkaline salts, and absorbent earths. Magnesia is a remedy of peculiar value for this last intention. In some cases of great obstinacy, but evidently dependant upon a chronic tendency to an acetous fermentation, magnesia, given in the proportion of an ounce a-day, has effected an entire cure:* and, in all cases it resists the costiveness as well as the acidity, and is far less disposed to coacervate in the alimentary canal than the calcareous earths. It is also, as I have already observed, a powerful antidote against that class of calculous concretions in the kidneys and bladder that depend upon an acid principle.

The eructations that occur in dyspepsy, however, are not always acid. They are often of a compound and very offensive taste, and give to the breath the smell of carburetted hydrogen gas, or rotten eggs: as though the gastric juice were incapable of performing its proper office, and the food were retarded in the stomach till the process of putrefaction had commenced. In this case, instead of avoiding acids, we should recommend a free use of them, from whatever quarter they may be obtained; as they not only tend to correct the fœtor, but to strengthen the stomach. The mineral are the most powerful; and of these the sulphuric is by far the pleasantest. It may advantageously be employed as a medicine; but for acidulated diet-drinks, it

GEN. V.
SPEC. VII.

Limosis
Dyspepsia.
Emetics,
how far use-
ful.

Gentle
stimulants.
A spare diet
often injuri-
ous.

Flatulency
to be cor-
rected, and
how.
Acidity a
cause of
eructation.
Magnesia,
its use.

Acids when
useful.

Mineral
acids.

* See Dr. Watson's communication, *Medic. Observ.* vol. iii.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Vegetable
acids.
Compara-
tive value
of the diffe-
rent kinds.

must yield to the vegetable acids. These are of three kinds, native, distilled, and such as are obtained by fermentation. The first are commonly the most grateful, and especially when they exist in the form of fruits: but they are apt in weak stomachs to set free a very large quantity of air, and consequently to produce a very troublesome flatulency, and even promote the ascescent disposition of the organ. The citric and the oxalic may be exceptions; and there may be also a few others, but they are not numerous; and where these cannot be procured, we must have recourse to the acids elaborated by distillation, or a fermenting process. The last are called vinegars, whether obtained from malt, weak wines, or sugar; and being of themselves, when properly refined, very pure and dilute, they are capable, with a little care, of being rendered highly grateful.

Acid of tar-
water.

The distilled acids of vegetables have not yet been sufficiently tried to determine whether any of them possess any specific virtue. They were at one time very generally made use of under the guise of tar-water, which, when the taste is not disliked, will often be found useful in indigestions attended with offensive eructations.

Powder
of charcoal.

I will just mention another remedy which deserves a much more extensive trial than it has hitherto received for the symptom before us: and that is, powder of charcoal. From the experiments of Lowitz and others, this is now well known to be the most powerful corrector, next perhaps to the gastric juice, of putrid substances out of the stomach; and we can hence account for the success with which it has been occasionally employed as an internal medicine on the continent: the dose may be from half a scruple to a scruple, repeated three or four times a day.

Some de-
gree of
acidity in
the stomach
necessary.

Before I quite drop the subject of crudities in the stomach, I must observe, that our object should not be to destroy all ascendency whatever; for a certain proportion is natural to the organ from the early period of lactation, and appears necessary to the digestive process; and hence we are only called upon to moderate this quality when in excess: upon which ground absorbent powders, and even magnesia itself, when not actually necessary, may add to the mischief instead of removing it.

Costiveness
to be cor-
rected, and
to what ex-
tent.

Costiveness is a symptom of dyspepsy still more common than acidity, and one that requires a very vigilant attention. In our attempts to remove it, we should always bear in mind that it is a chronic and not a temporary concomitant; and, consequently, that violent purgatives are of all things to be avoided; and that such aperients should be preferred which act gently, and rather by soliciting the peristaltic motion of the bowels to the regularity of health, than by irritating them to a laborious excitement.

Rhubarb;
combined
with stimu-
lants, and
other medi-
cines.

Rhubarb is, for this purpose, one of the best articles in the *Materia Medica*; for while by its aperient power it relieves the present distress, we cannot have a much better tonic than its bitter. Where the bowels are merely sluggish, it will prove sufficient without any other cathartic; though it is better to com-

bine it with soap and such aromatics as agree with the patient. GEN. V.
It is often however incompetent of itself; and in such cases SPEC. VII.
derives, in the form of an extract, a valuable assistance from Limosis
half the quantity of the extract of aloes, or the compound extract of colocynth. Dyspepsia.

Since the publication of M. Daubenton's little tract in an English dress, very small doses of ipecacuan, not exceeding a grain or a grain and a half, have been extensively tried, upon the recommendation of this celebrated physiologist. The intention appears to be that of exciting a change of action in the secretions of the stomach: but notwithstanding the advantage which is said to have been derived from this medicine by the writer himself, it does not seem to have succeeded in this country; and indeed the dose is so small that little effect of any kind seems capable of being produced by its use. By some writers it is supposed, that in such minute proportions, it will slip over the pylorus, and prove aperient by acting on the intestines. I have rarely, however, found it to do this alone, though it is a useful auxiliary with aperients of a more decided character. And where there has been great irritability of the stomach, I have known it even in the dose of a single grain excite so much nausea as to prohibit its farther use. Far more service has occasionally been produced by an external application of the tartar-
Small doses of ipecacuan, how far useful.
emetic ointment.
the tartarized antimony to an ounce of spermaceti cerate; the quantity of a hazel-nut being rubbed in every night till the eruption consequent upon this application appears. In numerous diseases of the digestive organs, and particularly those of the stomach and liver, this kind of counter-irritation has been found highly useful, probably from the influence which is often produced through the whole length of a nervous fibre and its connecting branches or intersections, in consequence of exciting its extremity. It is to Dr. Jenner we are chiefly indebted for the attention, which has lately been bestowed upon the nature and effects of this singular remedy,* though it was occasionally long in use before his time.

The quicksilver or blue pill will also generally answer a good purpose; but is chiefly to be employed where we have reason to apprehend, that the one or both the portals of the stomach, and especially the pylorus, is in a scirrhus state; or that the dyspepsy is connected with a morbid condition of the liver, or some other allied viscus. In this case much benefit has also been derived from the white oxyde of bismuth, now more generally known as a cosmetic, under the name of *pearl-white*. For scirrhus affections of the stomach it has been tried successfully by Carminati, of Pavia; and apparently with equal advantage in France.† Independently of its discutient power, it has the virtue of allaying irritation in general; and, on this last account, Dr. Odier, of Paris, has employed it satisfactorily in
Quicksilver pill, when advisable.
Oxyde of bismuth, or pearl-ash.

* Letter to C. H. Parry, M.D., F.R.S., on the influence of artificial Eruptions in certain Diseases, &c. 4to. 1822. † Beaumé, Journ. de Méd. tom. lxxiv. Hufeland, Neue. Annalen, band i. p. 351.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

most of the acute diseases of the alimentary canal, especially in pains of the stomach, diarrhœa, and colic, as he has also in hysteria, and even in tooth-ache.* The best form of giving it is that of pills, in doses of from four to ten or twelve grains, four or five times a-day.

Chief inten-
tion, to re-
store the
tone of the
stomach and
system
generally.
Both objects
consentane-
ous.

In the meanwhile, we must never forget, that our primary object is to restore the stomach, or the system at large where the stomach is only secondarily affected, to its proper tone and strength.

The general plan, as I have already hinted, must be the same; for as the virtues of medicines can only be communicated to the system at large through the medium of the stomach; and as the state of the latter has at all times a powerful influence upon the former; there can be little doubt that, by improving the digestive function, the vigour of the system will be improved generally at the same time, and consequently that the energy of the whole of the moving fibres will be increased: while the collateral means of cure that are applied externally, as those of air, exercise, and sea-bathing, and which are chiefly designed to operate on the system at large, will convey an equal advantage to the stomach.

Stimulants.

The principal evils we have to encounter in dyspepsy are, deficient action, and a relaxed state of the fibres. For these, there are three classes of remedies to which we may have recourse: stimulants, to increase the action; and bitters and astringents, to augment the tone. The first, however, are of very doubtful advantage; for a lax state of fibres will bear very little increase of action without incurring an equal increase of debility; and hence stimulants can never be recommended alone, except in cases of emergency, as to remove a severe fit of pain or other inconvenience, and then only for a short period of time; but they may be combined very advantageously with either astringents or bitters, and particularly with those medicines that possess these qualities jointly.

Astringents
and bitters.

Bitters, besides restoring tone where it is wanted, have another and more immediate advantage in the disease before us: for they directly attack that tendency to fermentation in the stomach which is one of the most prominent features of dyspepsy, and which is, indeed, the chief cause of the flatulence and acidity that so generally accompany it. Of this we have no doubt; for the experience of every day brings its testimony: and we employ bitters, as hops and quassia, for this very purpose in our fermentable beverages.

Whether
they destroy
tone under
any circum-
stances.

How far it may be true, as conjectured by Dr. Cullen, that bitters, like stimulants, possess also some deleterious property; and that a too free and long continued use of them destroys that very tone of the stomach† which a shorter and more moderate employment has established, it is not at present worth while to enquire, as we shall have occasion to return to the subject when treating of the nature and cure of gout. That some of them

* Journ. de Méd. tom. lxxviii.

† Mat. Med. vol. ii. p. 64.

contain a mischievous and even a sedative power in union with a bitter principle is unquestionable, for we see it distinctly in the hop, the *ignatia amara* or *nux vomica*, and more especially in opium; but to ascribe this sedative or narcotic quality to the bitter principle itself, as Dr. Cullen does in his explanation of the nature of gout, is only to start one hypothesis in support of another. And as the good is unquestionable and immediate, and the evil doubtful and remote, and in every view may be easily avoided by a careful attention to time or a careful rejection of such bitters as may be suspected, it is to tonics of this kind we ought to have recourse without hesitation, and to look up with a confidence of success.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Their sedative power probably distinct from their bitter principle.

Stimulants, astringents, and bitters, are, then, the three classes of medicine, with which we are to make inroad against the intrenchment of dyspepsy. They may often be conveniently united, and have their forces hereby increased in a more than double proportion. The stimulants, indeed, ought rarely to be employed by themselves, except in spasmodic pains, or some other temporary extremity. Many of these may be found in the list of carminatives already described under the species

Stimulants of most service in union with them.

CARDIALGIA.
One of the most valuable medicines of the kind now under contemplation is myrrh. In doses of six or eight grains, it will often excite an agreeable warmth in the stomach without increasing the pulse; and, when it does not sit easy in the powder, it should be given in an extract made with water, in which form it is peculiarly mild.

Myrrh useful as a stimulant and bitter.

There is an old medicine, whose virtues approach to those of myrrh, now no longer in use, which also peculiarly deserves a trial in this disease, and that is the cassamuniar, or casmunar, a tuberous Indian root, bearing from its joints or circles some resemblance to galangal. It has the smell of ginger, with a mixed taste of zedoary and camphor.

Casmunar.

I have observed that dyspepsy is often grafted upon an hysterical or hypochondriacal diathesis; and in these cases we may indulge in stimulants of a much warmer character, as camphor itself, assafoetida, the alliacea, the spicy aromatics, and even capsicum. Of the last it may be remarked that, though the hottest of all the peppers, it has a less tendency to produce complaints of the head than any of the rest. It is one of the best carminatives possible in the case of flatulency from vegetable food; and admirably calculated to remove that stony coldness, which distresses a weakened stomach when attacked by a transfer of gout.

Where the more powerful stimulants may be employed.
Capsicum.

In selecting from among the simple bitters, we need not be particularly nice, for their principle is the same; the quassia perhaps possesses it in the highest degree, though some have doubted of this; then the gentians; and next to these columbo. Of the gentians the most powerful seems to be the *g. purpurea*, first imported into this country by Dr. Home, from Norway, and then known by the name of *cursuta*, from its Norwegian name *skarsoete*. As a simple bitter it is best to unite it with

Simple bitters.

Gentian.

GEN. V.
SPEC. VII.
Lymosis
Dyspepsia.

some aromatic. The tincture of gentian of the London College, which is an improvement upon Stoughton's or the stomachic elixir, by exchanging the cochineal for the smaller cardamom seeds, is an excellent form for occasional use; but as alcohol should be habitually abstained from in the disease before us, it cannot be employed alone in such quantity as to promise any real benefit, though it may be allowed to enter as an ingredient into more compound remedies.

Columbo.

The bitter of the columbo is combined with a slight and not disagreeable pungency, and has an aromatic smell. It is hence peculiarly calculated for dyspeptic affections, and in most cases will sit easy on the stomach, in the form of powder in doses of fifteen or twenty grains; and will often give a check to sickness, where bile is not present, more than any other medicine we can employ. It is singular, that, to the present hour, we are unacquainted with the plant that furnishes this excellent drug. Commerson believed it to be a species of *menispermum*; and Willdenow a species of *brionia*. [Formerly, the root was erroneously supposed to be named from the capital of Ceylon, which was regarded as the place from which it was exported. But, according to Dr. A. T. Thomson, it is now known to be a staple article of export with the Portuguese at Mozambique, whence an entire root was taken to Madras by M. Fortin, in 1805, and a plant raised from it there by Dr. Anderson. From a drawing in the possession of the Linnæan Society, the plant appears to be of the natural order of *Menispermæ*, but the genus cannot be determined, in consequence of the female flowers not having been as yet seen.*] It seems to have been first noticed by Redi in 1685.†

Compound
bitters.

Nux
vomica.

Wormwood.

There are several other plants that possess a bitter principle in a more intense degree than any of these, as the *nux vomica*, and wormwood: but they are not simple bitters. The first is a stimulant narcotic; it takes off the sensibility, but renders the head confused; and at the same time excites the irritable fibres to irregularity of action. It has no pretensions to be employed in the disorder before us. Whether wormwood possess any thing of the same principle, I cannot satisfactorily determine. If it be present at all, however, it exists only in a very small proportion; and the plant as a stomachic is greatly improved by the possession of a stimulant essential oil. It is perhaps less grateful than the hop, though at one time very generally employed in the composition of purl; but so far as I have been able to judge, it has all the medicinal properties of the hop in a much higher degree.

Chamo-
mille.

As a plant uniting the two principles of an essential oil, warm without being unduly stimulant, and a powerful bitter, the chamomile is, for the purpose before us, one of the best remedies that we can select. It may be taken in a watery infusion, or an extract; but if in the former, the menstruum should be closely covered, that as little as possible of its volatile aroma

* London Dispensatory, 2d edit. p. 78.

† Experimenta circa Res Naturales, p. 142.

may fly off. And it should be farther observed, that the infusion should not be continued for longer than an hour; and perhaps a shorter period may suffice.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

As we have medicines that unite the two qualities of bitterness, and a stimulant or aromatic warmth, so we have those also that unite the two qualities of a bitter and an astringent; of which the cinchona furnishes us with a striking example: and hence this medicine has been long, and deservedly, one of the most popular of any for debilities of all kinds, whether of the digestive organs alone, or of the system generally. The cascarilla bark has pretensions of a like kind, but far inferior in degree, notwithstanding the high encomiums that have been paid to it by the Stahlian school, which endeavoured to hold it up as a rival to the cinchona. There are many stomachs, however, which will not bear the latter, even in decoction or infusion, and in such cases, either the sulphate of quinine, or, in lieu of this, the cascarilla may be prescribed.

Cinchona.

Cascarilla.

The acids, both mineral and vegetable, are valuable astringents in particular states of the stomach resulting from dyspepsia: for it is obvious, that from the tendency of this organ to co-operate in so many cases in the production of a superabundant acetous fermentation, acids cannot at all times be had recourse to. I have occasionally, indeed, employed the mineral acids, and particularly a mixture of the nitric and muriatic acids, in the proportion of one part of the former to two of the latter, for the purpose of checking this tendency to acidity, in several instances with success; but the plan has not answered generally; and it will hence be better to limit this class of medicines to the intention I have already pointed out, or to delay them till we have by other means overcome the disposition of the stomach to this morbid action.

Acids as
astringents.

The other mineral astringents, which have been employed besides acids, are not numerous; and may be limited to the preparations of iron and zinc. As general tonics, these, under different forms, have proved very extensively successful; but they are less adapted to dyspepsy proceeding from primary imbecility of the stomach or its adjuvant organs; or I should rather, perhaps, say, that they are apt to disagree with these organs till they have been restored to some increased degree of tone, beyond what they usually possess when medical aid is sought for.

Prepara-
tions of iron
and zinc.

I have observed, that there is always some degree of acid existing in the stomach in a healthy state, and we have seen, that one of the most troublesome symptoms of dyspepsia is a morbid increase of this principle. And hence, upon an idea that the acid, if thus formed in the stomach, may of itself be sufficient to answer the purpose of the sulphuric and reduce the particles of the metal to a due degree of tenacity, both the zinc and the iron are also frequently employed in the simple form of filings, rust, oxydes, or calces; and often with the happiest success. And that an acid adequate to this end does in most cases exist in the stomach, is sufficiently proved where the rust of iron is

GEN. V.
SPEC. VII.

Limosis
Dyspepsia.
Simple me-
tallic pre-
parations
unite with
the acid of
the stom-
ach.

employed, by the black colour of the stools, which may be regarded as a test of the proper solution of the iron; as it may be also of the existence of bile in a state of healthy bitterness: for it is by a combination of the iron with the bitter principle of the bile that this blackness, which is a natural ink, and obtained by the same means as artificial ink, is produced. There are some animals that have a power of forming this sort of natural ink at option, as the sepia or cuttle-fish, but whether by a solution of iron I cannot undertake to say. This, however, is very probable, if it be used, as it is generally understood to be, by the Chinese, as an ingredient in the manufacture of Indian ink. The cuttle-fish, when exposed to danger from the attack of an enemy, throws it forth very freely, employing it, indeed, as a means of defence; and effecting his escape by thus converting the water around him into a black muddiness that sufficiently conceals him from view.

Sulphates
preferable
to oxydes.

It is on this principle that the flowers or oxyde of zinc, have by many physicians of great reputation been preferred to the sulphate: and it is certain, that, in the form of an oxyde, we can introduce a much larger quantity either of zinc or iron, than in that of a salt: but it does not follow from this fact, that the metal may be more efficacious; for from the doubtful measure and strength of the acid existing in a free state in the stomach, there may not be enough to dissolve or form a salt, with the whole of the dose, and consequently a considerable portion of it may be lost or remain inert. And on this account I think it better to have recourse at once to the sulphate of both these metals, whenever it be judged expedient to employ them, than to trust to the chemical changes that may take place with so much precariousness in the stomach.

Small doses
applied to, to be
increased
gradually.

In employing the metallic salts, and, indeed, tonics of every kind, in disabilities of the stomach, it is a good rule to begin with small quantities, and advance to a full dose by degrees; thus reversing the method that it may often be found advantageous to follow in acute diseases, when the life of a patient may depend upon a bold practice, adopted instantaneously, and gradually remitted, as soon as the object has been obtained. The chronic character of dyspepsy on the contrary allows us time; and as no two stomachs will perhaps bear the same precise dose of a remedy, with the same precise effect, on account of the caprice of this organ in a deranged state, it is better to feel our way before us, and to reach the proper point by degrees; for if we over-dose the patient at first, we add to the disease instead of opposing it, and require many days, perhaps weeks, to bring him back to the actual state in which we found him.

In conjunction with this internal treatment it is probable, also, that an external application of the voltaic power to the stomach may increase its energy. In the hands of Dr. Wilson Philip, it appears to have been of decided advantage.

Voltaism
applied to
the stom-
ach.

Prussic
acid.

[According to the reports of Dr. A. T. Thomson, Dr. Granville,*

* Historical and Practical Treatise on the Hydrocyanic Acid in Pulmonary Consumption, &c. 2d edit. 8vo. 1820. Also, Farther Observations, &c. 1819.

and Dr. Elliotson,* the prussic or hydrocyanic acid is a valuable medicine in many cases of dyspepsia. Eighty years ago, it seems that nurses were in the habit of relieving the flatulence of infants by putting into the pap a laurel-leaf,† the virtue of which is supposed to have depended upon its containing a minute quantity of the acid under consideration. This remedy, however, was distinctly praised by Sprengel, in 1814, for its good effects in complaints of the stomach, dyspepsia, and hypochondriasis;‡ and even at earlier periods, for these and other cases, by Hufeland, Haller, Swediaur, and others. The dose for commencement may be three minims of the diluted acid, thrice a day. One of the most distressing symptoms, sometimes attending dyspepsia, is uneasiness in the chest, with occasional fits of palpitation; while, in primary organic diseases of the heart, many of the most troublesome symptoms of dyspepsia also occur, particularly flatulence. In such cases, Dr. Macleod§ recommends the exhibition of hydrocyanic or prussic acid, as a means by which the patient's sufferings may be considerably lessened. In one instance of diseased heart, accompanied by dyspeptic complaints, ten drops of diluted prussic acid were prescribed in a five-ounce mixture, of which two table spoonfuls were taken at first three times a day, and afterwards the whole quantity in the course of twenty-four hours. From Dr. Macleod's account, the medicine rendered the patient's journey to the grave much more bearable, than it would otherwise have been.]

GEN. V.
SPEC. VII.
Limosi
Dyspepsia.

While, however, a proper course of medicine is pursued, a proper course of diet and regimen must accompany it, or with the utmost professional skill we shall make no progress. And hence to the remarks already made at the outset, that where the disease has been brought on by a life of indolence, sedentary occupation, or too free indulgence of any kind, the general habit must be changed, and regularity of meals, sleep, and exercise be rigidly insisted upon, it is necessary to add a few other observations to the same purport.

General
rules.

One substantial meal of solid animal food daily is sufficient for a man in full health, engaged in a life of ordinary labour. Yet there are many who, without any labour, are from a long habit obliged to take two or even three. But the habit is bad, and cannot too soon be broken through. It follows therefore, of necessity, that, where the stomach is weak, the toil of digesting one full meal of animal food is the most that should be put upon it. This should take place as nearly as may be to the hour of noon, certainly not later than one or two o'clock, so as to occupy the middle of the wakeful period. The animal food should consist of one dish only; and be confined to such as is lightest of digestion, or as the peculiar state of the stomach may call for: for, in both these respects, there is a considerable difference. Thus shell-fishes do not always agree with weak stomachs, and will sometimes excite great uneasiness, with pyretic heat, and even

Diet and
regimen.

* Numerous Cases, illustrative of the Efficacy of the Hydrocyanic or Prussic Acid in Affections of the Stomach, &c. 8vo. 1920. † Langrish, Phys. Exp. on Brutes. ‡ Pharmacologia. § Med. Phys. Journ.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

throw out a nettle-rash, or some other cutaneous eruption. Yet where they sit easy and are relished, several of them, as the crab and lobster, are found to neutralize acidity in the stomach more readily and effectually, than any other kind of animal food: an effect we should little predict, considering that they give out, on a chemical analysis, a smaller proportion of ammonia than the flesh of quadrupeds, birds, or even amphibials. The food of young animals is less nutritive than that of old, but it is, in general, digested with less irritation. Many writers have arranged the different animals that furnish food in tables, founded upon their supposed degree of nutriment. But they have drawn them up with considerable variations; in some instances apparently according to their own fancy. I have not space to enter into a comparison of these, nor is it necessary. Those who have leisure for such a study may turn to Dr. Darwin's, which is perhaps one of the best, and which they will find in his *Zoonomia*. Generally speaking, the tenderest food is that of the gallinaceous birds: then that of the ungulated quadrupeds; among which the stag, or cervus kind, claims the pre-eminence; and to this succeed the ox, sheep, and hare, in the order in which they are here placed. Yet it should be observed, that the last, though less nutritive than the preceding, is more easily digested than several of them; as it should also, that the flesh of animals in their wild or native state, though less coveted by a pampered palate, offers a more wholesome and digestible aliment, and is more perfectly animalized, than that of animals cooped up and fattened for the table. Below the hare, we may place the web-footed birds that are ordinarily brought to market; and below these, the oyster and lobster tribes, and lastly, the numerous genera of fishes. The simpler the cookery of all these the better; for the complicated processes employed to give new forms to the productions of nature, or even to break them down for the use of the stomach, and thus keep the masticatory organs in a state of indolence, injure, instead of promoting the health of a dyspeptic patient. We have already observed, that the saliva forms an important part in the chemistry of digestion, and it is best applied to the food when first secreted and in the act of mastication; and hence if this act be prevented or suppressed, the food is without one of its auxiliaries. It is on this account, that concentrated jellies, and all mashed dishes, sit more uneasily on a weak stomach, than meat taken in a solid form.

What foods
are most
tender
among ani-
mals.

Cookery
cannot be
too simple.

What vege-
table foods
allowable.

The vegetable nutriment should be such as is least disposed to ferment in the stomach; and hence all kinds of new bread, sweet preserves, confectionary, and pastry must be sedulously avoided; and the crust of bread, toasted bread, and unleavened biscuits take their place. The farinacea, whether seeds or roots, as rice, wheat, flour, in the form of light and simple pudding, and potatoes, may be allowed in moderation. Water too is the best beverage; but where there is great flatulency, a small portion of brandy may occasionally be added. The only condiments that can be conceded are salt and spices: pickles

might be admitted where acids constitute a part of the medical treatment; but they are disposed to provoke a false appetite, and hence to weaken the stomach by overloading it.*

From fixing the principal meal so near the hour of noon, it is clear that we suppose the day to commence at a very different period from the ordinary regulations of fashionable life; in which the bed is rarely quitted before nine or perhaps ten o'clock, after a night of imperfect and feverish sleep, when the languid idler immediately proceeds to a breakfast of tongue, ham, and eggs, in addition to the ordinary materials of his meal, as though he had been already labouring in the field for two hours; and by means of their combined stimulus, fills his stomach with a load, which might indeed do good to the husbandman, but to himself proves nothing more than a mischievous oppression. Yet to this morning toil of the stomach succeeds, at about two o'clock, the ordinary luncheon in a still more solid shape; followed in the evening by a dinner of numerous courses, with high seasoned condiments and a stimulating change of wines; the real business of this vain and frivolous life perhaps not commencing till the better-disciplined peasant has begun his quiet sleep: when, roused by a flow of factitious spirits, and primed for gaiety and gallantry, the votary of pleasure, as it is called, sallies forth to join his comrades at the allotted place of rendezvous, and to pass the midnight in hot and crowded ball-rooms, or in orgies of a still more exhausting nature. Of the whole of this career, the only rational part of it is the luncheon a little after mid-day; this may be copied by the invalid before us, as his dinner, but from all the rest we must carefully shut him out. He should quit his bed by six or seven o'clock in the morning in the summer, and by seven or eight in the winter; and, after having risen for an hour, he may partake of a light breakfast of milk, cocoa, sassafras, or any other aromatic or warm-flavoured tea, with toasted bread, the crust of bread, or sea-biscuits, as observed already. The morning may be devoted to such exercises or recreations as may be most agreeable without producing fatigue. To this will succeed the chief meal of the day, upon the plan already laid down; and a light refreshment of the same nature as the breakfast should conclude the daily diet, a few hours before retiring to rest, which should never be later than eleven o'clock. Sea-bathing, or the shower-bath, before breakfast will considerably add to the means of improvement wherever these advantages can be enjoyed, and particularly when the warmth of the season may give them the character of luxuries.

[The systems of dietetics offered to the world are innumerable, and marvellously contradictory to each other. Some, looking with an evil eye on the refinements of society, would bring

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Mischievous arrangement of fashionable meals.

Rising,
exercise, refreshment,
and rest.

No system of dietetics applicable to every individual.

* On the subject of Dietetics, the reader may consult Arbuthnot on the Nature of Aliments, 8vo. Lond. 1731; Fordyce on Digestion, 8vo. Lond. 1791; J. Abernethy on Local Diseases, including Derangements of the Digestive Organs; A. P. W. Philip on Indigestion, 8vo. Lond. 1826; J. A. Paris on Diet, Lond. 1827; J. Johnstone on Morbid Sensibility of the Stomach, Lond. 1827.—EDITOR.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

us back to the simplicity of savages, and have us live "according to nature." Though, when we ask, with the Prince Rasselas, what it is to live according to nature, we are sure to meet with no more satisfactory answer, than what was vouchsafed to that noble enquirer. The truth is, however, that our bodies would be as little bettered as our minds, by going back to the state of savages; for it is now ascertained that savages are universally short-lived, and subject to sudden and violent diseases. Population increases slowly amongst them, and the healthiest and strongest of them, if compared with the average of well-fed civilized Europeans, will be found inferior both in strength and health. Some theorists again would have us live solely on animal food, and assert, that the human viscera bear vegetables "only in a grumbling way;" while others would reduce us to the diet of Nebuchadnezzar, and not leave a flesh-pot in our kitchens. The different notions on dietetics by no means end here. Some sage doctors will never allow us to fill our stomachs, and some hold that they should never be altogether empty; some reduce the whole mystery of nutrition to a skilful exhibition of successive stimulants, and others to the exclusion of all that can interfere with the balsamic simplicity of the insipid chyle; some hold all fermented substances pernicious, and others think fermentation the best preparative for digestion. But, as the judicious critic, to whom we are indebted for the above reflections, has observed, how is it possible to say what is absolutely the best diet for human beings, when we consider under what an infinite variety of different habits such beings are found to live in health and vigour, and by how many opposite causes their health and vigour are impaired? The same diet that is sanative to one, whose digestion has been weakened by scanty and penurious living, cannot possibly be suitable to another, who has suffered from a long course of repletion and excess. The regimen that is most wholesome for youth is not likely to be well fitted for old age; nor can that which answers for the active and laborious be proper for the studious and sedentary. Nay, your dry and adust subject plainly requires a different regimen from that of the plump and succulent. A lover should not be dieted as a miser; nor a champion of the fancy like a prime singer at the opera. Every man differs from every other in some of the important attributes of age, habit of body, occupation, temperament, and disposition, to which may be added climate; so that all rules of diet must plainly require innumerable modifications to accommodate them to the condition of those classes of persons, even if it were possible to reduce them to certain classes. Besides all this, there are special and apparently capricious varieties of digestive power, which the learned call idiosyncrasy, by which the application even of those vague and variable rules must be constantly frustrated.* All directions, which are rational, must be founded on the circumstances of the individual to whom they are offer-

* See Edinb. Review, No. 93, p. 38.

ed; and even then cannot be deemed valid, until they have been confirmed by his particular experience. The general instructions, given by the author of this work, with reference to the diet of dyspeptic persons, may be considered as good and valuable.]

Proper temperature and clothing are also subjects of some importance; but as we shall have occasion to enlarge upon these, more particularly when treating of PHTHISIS, I shall only observe at present, that the feet and chest should be kept especially warm, and that all extremes of heat and cold should be sedulously avoided; a general glow on the surface, when produced by exercise, will be advantageous, but it should not be carried to the extent of much sensible perspiration, as this might terminate in a debilitating chill. And where the languor is so extreme as to prevent exercise abroad, that of a swing or rocking-horse may be had recourse to at home; or where these cannot be endured, that of general friction, in any of the multiplied forms now in use, and especially friction of the stomach and belly, may be often employed as an advantageous substitute. Every tender mother is well acquainted with the benefit of such an external stimulant to her infant; and when judiciously applied, it may often be rendered so to an adult in cases of great dyspeptic languor and weakness.

[In the valuable paper by Dr. Abercrombie on chronic inflammation and ulceration of the stomach, many judicious observations may be found relative to dyspepsia. From the facts which he has related, it appears that the above dangerous affections of the stomach may exist with much diversity of symptoms. These may be severe and indicative of serious disease, or they may be such as, without very great attention, are likely to be considered as merely dyspeptic. In one case of extensive malignant ulceration of the mucous coat of the stomach, which was under the care of Dr. Chambers, no nausea and sickness existed, and all the symptoms, such as tormina, tenesmus, and frequent discharge of small liquid bloody motions seemed to indicate disease of the bowels; yet the latter parts were found after death very little affected.* There may be hardness in the region of the stomach, or nothing may be discoverable by the most attentive examination; and it is in fact extremely difficult to propose any rules, by which chronic inflammation of this organ can be distinguished in its earlier stages. It may be suspected, when there is either permanent uneasiness in the region of the stomach, or pain recurring with regularity after meals, and incapable of prevention by attention to diet; when there is tenderness on pressure, especially if the pain and tenderness be always referred to a particular spot of small extent, and distinctly defined; when, along with the symptoms, vomiting occurs at short periods after meals, and after food of the mildest quality; and when, without any urgent or defined symptoms, a patient, with affections of the stomach, becomes progressively weakened and emaciated, in a manner which his symptoms, if considered as merely dyspeptic,

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

Tempera-
ture and
clothing.

Exercise in
extreme
weakness.

Friction of
the stomach.

Dyspeptic
complaints
from organ-
ic disease.

* Med. Gazette, vol. i. p. 63.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

could not account for. As Dr. Abercrombie confesses, however, none of these symptoms can be depended upon; most or all of them may exist in connexion with a state of the stomach which is merely dyspeptic; and, under a more serious form, they may end fatally, with every appearance of extensive disease, and yet no morbid change be discovered in the stomach or neighbouring parts. Yet he rightly urges the remembrance of the important practical truth, that symptoms, which at first sight appear to be merely dyspeptic, often depend upon chronic inflammation of the stomach. When there are grounds for this suspicion, he thinks that, though general bleeding is seldom admissible, much benefit may result from topical bleeding, blisters, issues, antimonial ointment, food of the mildest kind, and in very small quantity, and the avoidance of stimuli and bodily exertion.*

The foregoing observations derive much confirmation from the statements of Mr. Annesley, in the practical work† which he has lately published. In warm climates, he says, inflammation of the mucous membrane of the stomach is a very common form of disease; and it takes place to a greater or less extent in the advanced stages of dyspepsia, the dyspeptic symptoms being truly the effect of gastric inflammation.

Some highly interesting observations on this subject have lately been published by Dr. Armstrong;‡ and, if they be correct, a part of the difference in the symptoms, in different cases, may in some degree be explained by the chronic inflammation being sometimes situated in the serous, sometimes in the mucous, membrane of the stomach; a topic, which will be farther noticed in treating of gastritis. As the above judicious physician has remarked, there is something forcibly striking in the expression of the countenance and colour of the skin in most organic diseases. Thus, in tubercular disease of the lungs and elsewhere, the cornea becomes more shining, and the conjunctiva more pearly and blanched than natural, with a softness and almost pensiveness of expression; while the face grows more and more sharp, and the skin acquires a much more delicate hue. In scirrhus, the expression is that of more or less solicitude, and the skin commonly has a sallow tint, like that of the pale yellowish willow; whereas, in fungus, the skin has neither the delicacy attendant on tubercle, nor the sallowness accompanying scirrhus; but it is often of a dull muddled white, almost resembling that of tallow, or putty. Some change about the face and skin will frequently lead the experienced eye at once to suspect deep visceral derangement. Without being led away by first impressions, however, the pathologist will be careful not to confound the ventricular disturbance and sallowish aspect of the sedentary and studious dyspeptic with any organic disease of the stomach; for, though in him the face be "sicklied

* See Edinb. Med. and Surg. Journal, No. 73, p. 12. † Researches into the Causes, &c. of the Prevalent Diseases of India, vol. i. 1828. 4to.

‡ See Morbid Anat. of the Bowels, Liver, and Stomach, p. 42, &c. Lond. 1823.

o'er with the pale cast of thought," yet it is most frequently GEN. V.
an indication merely of disorder which admits of cure, and, SPEC. VII.
even if continued, may not at all shorten life.*]

GENUS VI. COLICA.—COLIC. BELLY-ACHE.

Gripping pain in the Bowels, chiefly about the Navel, with vomiting and costiveness.

THERE are various diseases to which this definition will apply; but which, nevertheless, differ from each other in several particulars. M. de Sauvages thought these particulars of so much importance as to justify him in advancing each of these complaints to the rank of a distinct genus, under the names of gastrodynia, colica, rhachialgia, and ileus. Dr. Cullen, however, judged differently and more correctly. He regarded their distinctions as of subordinate moment, and in their prominent symptoms traced so close a resemblance as to indicate their being a sort of natural tribe or family: and he has consequently simplified them into one genus under the name here adopted, of COLICA. In the ramifications of his species, however, he seems a little too diffuse, and he has unnecessarily, and somewhat capriciously, varied a few of the ordinary specific names, as those of ILEUS and RHACHIALGIA, which, for reasons assigned in the volume of Nosology, are here restored. In other respects, the present arrangement does not especially differ from Dr. Cullen's classification. The species that seem fairly entitled to attention are the following:

Sauvages' arrangement.

Cullen's arrangement.

- | | |
|---------------------|--------------------------------------|
| 1. COLICA ILEUS. | ILEAC PASSION. |
| 2. ——— RHACHIALGIA. | COLIC OF POITOU, OR PAINTERS' COLIC. |
| 3. ——— CIBARIA. | SURFEIT. |
| 4. ——— FLATULENTA. | WIND-COLIC. |
| 5. ——— CONSTIPATA. | CONSTIPATED COLIC. |
| 6. ——— CONSTRICTA. | CONSTRUCTIVE COLIC. |

SPECIES I. Colica Ileus.—*Ileac Passion.*

Gripping pain, vomiting, and costiveness accompanied with retraction of the Navel and spasms of the muscles of the Belly.

THE name of Ileus (ἰλεος or εἰλεος, for it was written both ways) is entitled to veneration, as it has descended to us from the earliest Greek writers, who thus denominated it, either from that intorsusception or convolution of the intestinal tube, which so often accompanies the disease, and which is the direct meaning of the term; or from the ileum or small intestine in which the disease is principally or most usually seated. Sauvages, and nearly all the continental writers, continue the term. Dr.

Name whence derived.

GEN. VI. Cullen has exchanged it for spasmodica, as an adjunct to colica :
 SPEC. I. but by perusing the comment to the Nosological Synopsis just
 Colicæ ileus. referred to, it will be seen that he has gained nothing hereby,
 either in regard to precision or elegance.

Vomiting of
 feces. The griping pain or belly-ache in this species is very acute,
 and the vomiting is accompanied with a discharge, not only of
 bile from the duodenum, but of stercoraceous matter from the
 large intestines, or of injections introduced into the rectum ;
 forcing their way through the strong muscular valve of the
 colon, which we have already noticed as being formed by a
 natural prolapse of the ileum, for the purpose of preventing a
 regurgitation of the feces into this last intestine ; and evidently
 proving a powerful inversion of the peristaltic action through the
 whole or nearly the whole length of the intestinal canal. While
 the obstinate costiveness, which attends at the same time, pretty
 clearly indicates a spasmodic constriction, though rarely pro-
 ducing a total occlusion, of that part of the canal where the
 pain is most violent, often indeed extending to other parts, and
 even to the bile-ducts. And in this last case, even where the
 feces are discharged by the mouth, they are untinged with bile,
 while all the symptoms of jaundice supervene.* The morbid
 action is, indeed, not unfrequently so violent as to excite inflam-
 mation over a considerable part of the intestine chiefly affect-
 ed ; and consequently to aggravate all the other symptoms.

Spasmodic
 constriction
 of the
 bowels.

And hence the disease is presented to us under the two fol-
 lowing varieties :

- | | |
|----------------------|-------------------------------------|
| α Fæcosa. | The vomiting accompanied with feces |
| Stercoraceous colic. | or substances injected by the anus. |
| β Inflammatoria. | Accompanied with symptoms of in- |
| Inflammatory colic. | flammation. |

The dissection of persons who have died of either of these
 varieties has shown us, in some cases at least, that one portion
 of the affected intestine, constricted and lessened in its diame-
 ter, has fallen into another portion below it, and thus produced
 what is called an INTROSUSCEPTION, or involution of its coats ;
 but we dare not say that such an involution is common to every
 case of the disease, and we have reason to believe that in the
 slighter attacks it is not so. The fact is not difficult to be ac-
 counted for ; and it will readily explain the cause of the great
 torture which is often suffered under the influence of this grievous
 malady. In every case in which the intestinal tube is weak-
 ened, there is a very copious extrication of air, producing in
 many instances a palpable distention of the parietes of the
 abdomen. In ileus, however, there is also, as we have already
 observed, in conjunction with this, a strong inversion of the
 peristaltic action operating from the rectum to the stomach, and
 forcing back whatever recrement or other materials are co-
 accervated in any part of the intestines. These, by intermixing
 with the elastic vapour of the intestinal tube, become very

Introsus-
 ception
 often pro-
 duced.

* Bartholin. Hist. Anat. Cent. v. 62. Ephem. Nat. Cur. Dec. I. Ann. IV. v.

voluminous, and distend it to its utmost range wherever distention can be accomplished. In one or more parts, however, of its entire length, we have also seen that there is a violent spasmodic constriction, through which the distensive force cannot prevail, excepting perhaps by snatches, or during a remission of the spasm. The two powers are hence brought into immediate contact; and while the gut is in consequence rigidly contracted above, it is widened almost to bursting below; and, during the struggle which ensues, a part of the imprisoned contents of the expanded intestine is forced upwards, and the collapsed portion of the superior intestine at the same time slides downward at the point of the stricture.

In the midst of this spasmodic commotion there is also another extraordinary change, which has been sometimes found to take place in the relative positions of different parts of the intestinal tube. For from the urgency of the moving power that works upwards, the natural effect of the gravitating power that works downwards, and the looseness of the convoluted canal itself in many parts, and its tightness from adhesions in others, it has sometimes become twisted into nooses and knots; in which the portion forming an encircling cord or bridle has been drawn so tight as to produce strangulation, and render gangrene inevitable.* In one instance, indeed, the spasmodic action was so extreme, that the bridle not only produced strangulation and gangrene, but cut through all the coats of the intestine on the opposite side to the mesentery, and made an opening of about an inch in length.†

Generally speaking, however, there is more danger in the second variety than in the first: the symptoms, if not early opposed, are more rapid in their progress, and gangrene is produced in a shorter period of time. Yet when an active and well discriminated course of treatment is pursued, the inflammation is very frequently subdued, and the patient escapes without further injury.

It is a singular fact, that though ileus is no uncommon result both of intussusception and inflammation, it sometimes takes place without either of them, or at least without intestinal pain or other manifest symptoms of inflammation or spasm; for which we have the authority of Stoll,‡ Haller,§ and Morgagni.|| Even where inflammation exists, it is not difficult to distinguish the disease from enteritis, by the spasmodic contraction of the abdominal muscles that accompanies it, the diminution of pain which ensues upon pressing the abdomen, and the small degree of fever which is present, compared with that by which enteritis is usually characterized.

Both varieties of ileus are apt to run into each other, and the disease assumes the first or the second form from the patient's idiosyncrasy, the peculiar condition of the organs affected at the time of the onset, the temperament of the season, or some

GEN. VI.
SPEC. I.
Colica Ileus.

Vomiting of
feces and in-
tussuscep-
tion ac-
counted for.

Occasional-
ly strangu-
lation and
gangrene.

Second va-
riety com-
monly more
dangerous
than the
first.

How distin-
guished
from en-
teritis.

Both varie-
ties apt to
run into
each other.

* Mem. de l'Acad. Royale, xxiii. par M. de la Peyrouse.

† Med. Observ. vol. iv.

‡ Ratio Medendi, viii. 129.

§ Comment. Nova, Gotting. viii. l.

|| De Sedibus, &c. xxxv. 19. 21. 23.

GEN. VI. other adventitious circumstance. The causes therefore, for the
 SPEC. I. most part, are alike, and very numerous. The more common
 Colica Ileus. are acrid, cold, or indigestible esculents; cold beverages on a
 Causes. heated stomach; catching cold in the feet or abdomen; unalimentary substances swallowed through bravado or by mistake, as knives, metallic money, or pieces of glass, plum, cherry, or other fruit-stones; an excessive flow of bile, especially in a state of acrimony; worms; drastic purgatives in an over-dose, as scammony, black hellebore, and colocynth; which last has produced a troublesome colic of thirty years' standing;* calculus or other balls congested in the intestines, and obstructing their passage, as scybala, bezoards, and indurated feces; violent passions, or other emotions of the mind, as extreme rage or terror; a diminished capacity of the intestinal canal from scirrhus or cancerous tumours, or from an ossification, callosity, or coalescence of its internal tunic. It is also at times a consequence of transferred gout, or rheumatism.

Medical
treatment.

Venesection
how far to
be em-
ployed.

In the treatment of ileac passion, whenever there is inflammation, or a decided tendency towards it, evidenced by shivering or a full pulse, blood should be taken freely, and even repeatedly from the arm, whether the patient be of a strong, robust, or of a delicate and weakly constitution. It is a practice, indeed, recommended generally by many writers in the commencement of the disease, even where no inflammatory action exists, with a view of relaxing the spasmodic constriction: but in these cases it is not absolutely called for, and, where the habit is weakly, is likely to produce more harm than good.

The two next points to be aimed at are, a removal of the griping or spasmodic pain; and a restoration of the intestines, from a state of inverted action, to their proper peristaltic motion; and hereby a resolution of the costiveness.

Humid heat
and aperient
injections.

For the first, humid heat in the form of a warm bath, warm fomentations, and warm and copious clysters afford a rational chance of success. The last should be rendered emollient by a solution of oils, and moderately loaded with purgatives, so that both intentions of cure may be carried forward at the same time. In combination with these, opium may also be tried, and various other narcotics—and especially the extract of hyoscyamus, which, in many instances, evinces an aperient as well as a narcotic power. If the opium be employed in the form of a tincture, the dose should be from a hundred to a hundred and twenty drops in an injection of four ounces of warm olive oil. If hyoscyamus be had recourse to, we may safely use either the seeds or the extract: about four or five grains of the former, and ten of the latter may be added, to each injection. Clysters of a strong decoction of poppy heads have also frequently been found highly beneficial. And to these should succeed the application of stimulants to the belly, as volatile alkali, or blisters. Sir John Pringle speaks highly of the latter, and not without reason; for if made sufficiently

Narcotics.

Local sti-
mulants.

* Fordyce, Chirurg. and Med. Fragm.

large to be active, they often succeed not only in quieting the spasm, but in obtaining evacuations, after injections, purgatives by the mouth, fomentations, and opiates have been tried without effect.

GEN. VI.
SPEC. I.
Colica Hæm.

Purgatives for the second intention, and combined with antispasmodics, should, in like manner, be attempted by the mouth: though the vomiting is sometimes so incessant that we can get little or nothing to stay on the stomach. But the attempt must be made, and steadily persevered in. Calomel, in free doses of about four grains to a dose, will usually be found the best aperient medicine. It occupies the smallest space, and, in the form of a pill, has the fairest chance of being retained. If repeatedly rejected, it must be combined with opium, which nevertheless has a tendency to retard its action; but as the opium may mitigate the spasm and diminish the pain, it will commonly be found an useful adjunct, and a grain or two of it may be given every six hours. Calomel, however, though sure, is slow in its operation; and should hence, where the stomach will bear it, be united with some other and brisker aperient. Of these the neutral salts seem to answer best: but if they cannot be retained, we must exchange them for crystals of tartar, which are less likely to be thrown back. It is seldom that the drastic purgatives can be recommended; because if they do not succeed, they are apt by their stimulus to excite inflammation where it does not exist, and to increase it where it does.

Purgatives.

Calomel:

united with
neutral
salts.

Drastics
unadvis-
able.

Emetics
commonly
injurious.

The relief, derived from the symptom of vomiting, is apt to lead a practitioner to prescribe emetics; and the large quantity of green and variegated filth thrown up by them, would seem to show that the plan is judicious. But the benefit hence obtained is very transient; and the morbid secretion of feculent and bilious matter is promoted and augmented by the irritation of emetics; so that a succession of this porraceous recement may be continually procured by vomits, and the medical attendant may flatter himself that he is removing the cause, while he is only increasing the disorder. And hence, we should rather endeavour to abate the secretion by opiates and other sedatives, than excite it by emetics. I do not mean to say that emetics have never been serviceable, for where the disease proceeds from a foul stomach, they are advisable; and, by producing a determination to the skin, they have also sometimes succeeded as revellents: but they cannot be relied upon, except in special cases, and have oftentimes aggravated the spasm. The practice of vomiting is nevertheless supported by high authorities, though chiefly after bleeding. Dr. Stoll was in the habit of using and repeating emetics, three, four, and even five times with little interval.*

Dr. Cullen, on the advice of De Haen, recommends a continued stream of warm water thrown forcibly and with a proper syringe into the rectum, so that it may play like water from an engine upon the constricted portion of the intestine; and de-

Rectum
may be sy-
ringed with
warm
water.

* Rat. Med. part. ii. p. 135. 133.

GEN. VI.
SPEC. I.
Colica Ileus.
Cold appli-
cations ex-
ternal and
internal.

clares, that he has found this remedy to be one of the most powerful and effectual. When the ordinary means, and particularly those of warm injections and the warm bath, fail, some practitioners have been courageous enough to try cold applications both external and internal. Sir George Baker tells us, that a physician of credit informed him he had once prescribed the cold bath with success. And Citois affirms, that, in several species of colic, this was his constant practice, even in the midst of winter, and calls upon all his fellow-citizens to attest that most of his patients thus treated had been restored to health.* Saccassani relates the case of a person, instantly cured by drinking a large draught of cold water.† Professor Ploucquet affirms, that he has found it equally serviceable,‡ and Zacutus Lusitanus narrates the history of a patient who speedily got well by being rolled in snow.§ But these are extreme instances; and, notwithstanding an occasional success, the practice is not to be depended upon. It will prove most effectual where the colic is accompanied with, or produced by, hysteria. While, on the contrary, where it has been occasioned by too violent doses of drastic purgatives, warm stimulants, as the oil of turpentine, and even brandy,|| have been taken with great advantage.

In an arthritic diathesis, the disease has suddenly ceased upon the foot being attacked with a severe paroxysm of gout, which in one instance effected a radical cure where the colic had recurred periodically for six years.¶

How far
antispas-
modics to
precede
purgatives.

Dr. Percival, Dr. Warren, and various other writers upon their authority, advise that the antispasmodic plan, whether by the stomach or the rectum, or both, should take the lead, and the purgative plan follow. This will always be found the proper order in attacking the painters' colic: but we should lose much important time, and often allow the inflammatory symptoms to get fatally a-head, if we were to adopt this as a general rule in ileac passion; in which the symptoms, if not more dangerous, are more urgent, and demand a more rapid march of treatment.

SPECIES II. Colica Rhachialgia.—Colic of Poitou, Painters' Colic. Devonshire Colic.

The pain at first dull and remitting: but progressively growing more violent and continued; extending to the back and arms, and at last producing paralysis.

Specific
name,
whence
derived.

FROM the pains striking through to the back, Astruc first distinguished this species by the name of RHACHIALGIA (ῥαχιαλγία), literally, "back-bone-ache or spine-ache;" and as the term is highly expressive, and has been continued by most of the con-

* F. Citesii Opuscula Medica, p. 215.

† Epist. v. Haller, Bibl. Med. Pr. iii. p. 601. ‡ Init. tom. ii. Colica.

§ Prax. Adm. libr. ii. obs. 23. || Clossius, obs. 27. ¶ Van Zelst, Libellus singularis de Podagrâ et Colico Dolore. Lausanne, 1760.

tinental writers, it is retained as a specific name in the arrangement before us, notwithstanding that it has been dropped, or varied, or exchanged for some other, by several writers of our own country.*

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

Description.

The pain is most commonly seated, from the beginning to the end of the attack, at the pit of the stomach. It is at first dull, but gradually grows more severe; and as it increases, extends upwards to the arms, and downwards to the navel, back, loins, rectum, and bladder; and frequently to the thighs and legs. From the navel it sometimes shoots with so much violence to each side that the patient feels, and so expresses himself, as if some person were cutting him in two. Almost all the external muscles are rendered sore by the great violence of the pain, as though they had been affected with rheumatism, and can scarcely bear the weight of the bed-clothes or the slightest touch of a finger. Sometimes, however, the seat of pain alternates between the stomach, which nevertheless, as just observed, it never entirely quits, and the external muscles: it is violent in the stomach, while the lower bowels and the external muscles are at ease; or it nearly quits its hold on the stomach and lower bowels, and rages through the external muscles. Sickness is an early symptom, as well as costiveness; and as the pain in the stomach increases, the sickness increases also; even on the second day from the attack, the retchings are violent, and the discharge thrown up consists of acrid slime and porraceous bile. A momentary relief is hereby usually obtained, and the patient flatters himself that he is about to recover. Too soon, however, does he find himself disappointed; as long as the pain continues, the same morbid matter is secreted, and thrown into the stomach, and the retchings return with perhaps accumulated violence; or, if they do not, their place is supplied with bitter eructations and hiccoughs. The pulse, notwithstanding the severity of the sufferings, is little affected at first, and for several days continues as quiet as in health. After the fourth or fifth day, however, it sometimes becomes quicker, but not always: and it may admit of a question, whether the acceleration be not even at this period rather the effect of the medicines taken to procure relief, than of the disease itself.† [The skin, though generally cold and damp, is occasionally rather hot; but, in this disease, there appears to be no tendency to inflammation.] The urine varies so much in different individuals that no stress can be laid upon it. [In some cases, the sphincter muscles of the bladder and anus are so contracted, that the urine and feces cannot be voided, and a clyster-pipe is difficult of introduction.]‡ Towards the close of the disease, there is generally a pain round the edges of the feet, and at the extre-

[* According to Dr. Monro, the pathognomonic symptoms of painters' colic are the acute twisting pain about the navel, not increased by pressure; the dragging inwards of the abdominal parietes, which have a hard feel; tenesmus; and obstinate costiveness. *Morb. Anat. of Human Gullet, &c.* p. 246.—ED.]

† Dr. Warren, *Med. Trans.* vol. ii. p. 72.

‡ See Monro's *Morb. Anat. of the Human Gullet, &c.* p. 246.

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

mities of the toes, which are often red, and swollen, and to appearance gouty. Relieving sweats break forth, sometimes accompanied with an efflorescence. About the same time, a gripping of a different kind from what has hitherto been endured, and which is more easily bearable, takes place, attended with a disposition to go to stool: and after large discharges of various kinds of excrement, frequently of scybala or hard lumps, in shape resembling sheep's dung, together with black and dirt-coloured slime, occasionally mixed with blood, the patient is perfectly relieved. [After several attacks of this disease, a paralysis commonly affects the fingers, or the whole hand and forearm, so that the former become contracted, and the hand, when the arm is extended horizontally, hangs at a right angle to the arm, the exterior muscles being in both cases more paralyzed than the flexors. The palsied limb shrinks very much; and the muscles lose not only their natural size, but also their natural structure, being converted into a suety substance.*]

Paralytic
affection of
the upper
extremity.

Prognosis.

In a mild degree and under the best therapeutic plan, the disease can seldom be removed under five or six days; but if it be violent, neglected, or ill-treated, it will continue for weeks or even months, with now and then a truce for a few days; and will terminate in the above peculiar sort of palsy of the upper extremities; or in death, preceded by deafness, blindness, delirium, or epileptic fits.

Lead the
common
remote
cause.

The remote cause appears in almost every instance to be lead introduced into the system, either by the stomach, the lungs, or the skin: and hence the disease is found most frequently in those countries, and under those circumstances, in which this metal is most freely used or most readily dissolved. In the neighbourhood of smelting furnaces, pigs, poultry, and other animals evince the same complaint. Thus, too, in Poitou and Devonshire, in which lead was formerly employed to destroy the acidity of the weak wines and ciders for which these provinces are celebrated, it was at one time so common as to obtain the name of Devonshire colic, and colic of Poitou. And hence house-painters, whose occupation leads them to a constant use of lead, and who are, often, too little attentive to personal cleanliness, are to the present hour so frequently affected by it as to give it the still more general name of painters' colic. Plumbers, potters, glaziers, workers in glass, gilders, chemists, miners, and printers, are, in like manner, exposed to its attack from the large quantity of lead contained in the materials they are continually handling. I attended some years ago a printer, who had several times been afflicted with this disease, but had fortunately recovered from every attack, though each return proved severer than the preceding. The cause had never been suspected till I pointed it out to him, by enquiring whether, after leaving the printing-office, he was careful to wash his hands before he sat down to his meals; to which he replied, that he had never been put upon his guard on this subject, and had, there-

Why called
Devonshire
colic, and
colic of
Poitou.

Hence
called also
painters'
colic.

* See Monro's Morbid Anat. of the Human Gullet, &c. p. 247.

fore, never attended to it. I rigidly enforced upon him the necessity of doing so, and he continued for six or seven years without the slightest return. At this period, he again grew careless and confident; he again suffered, and lost his life.

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

[The power of lead to excite colic and paralysis has been long known, these effects having been frequently traced to the accidental or designed use of the metal as medicine, or in the food and drink. During the sixteenth and seventeenth centuries, when preparations of lead used to be given in large doses medicinally, the colica pictonum and paralysis, in their severest forms, appear to have been very frequent. Nevertheless, it was not until the investigations of Sir George Baker were published, that the poison of lead was suspected even to be the common, much less the exclusive cause of colica pictonum. In countries where the disease was endemic, it was attributed to a free use of the sub-acid wines, or other acidulous liquors, peculiar to the respective districts with which, in fact, it was very obviously connected. In the West Indies, the endemic colic, called the dry belly-ache, is observed to be the consequence of drinking freely of newly distilled rum; and this liquor is therefore universally considered as the cause of the disease. But, besides these peculiar fermented liquors, and other metallic poisons as well as lead, certain authors give credit to several other causes; viz. imperfectly cured fevers, gout, rheumatism, interrupted perspiration, scurvy, melancholia, and emotions of the mind.* To these latter circumstances, however, no one now attributes the origin of the disease. As Dr. Bateman remarks, the only doubt which can exist at present is, whether sub-acid and spirituous liquors possess any property, capable of producing the disease independently of an impregnation with lead?

Various facts, adverted to by this physician, tend to support the inference, that lead, under some modification or another, is the real cause of the disease. The cider of Devonshire produced the colic much more frequently and extensively than that of other countries, as of Herefordshire; and the wines of some districts on the continent excited the disease, when similar wines of other districts did not. Sir George Baker ascertained, that a small quantity of lead was employed in several of the mills, in which the apples were bruised for the manufacture of cider, to fasten the iron cranks which connected the stone-work. It is well known, too, that in several countries on the continent, the practice of sweetening the wines with litharge, and other preparations of lead, was very common, and that, in these districts, the colic was particularly prevalent. Dr. Moseley was cautioned by Dr. Menghin, of Inspruck, to avoid all sweet wines whatsoever, but particularly the common tavern wines, upon the road in the Tyrol and in Italy. He never deviated from this advice but once, at Viterbo, and then he paid dearly for his indiscretion.† Colica pictonum is very prevalent in this

That lead
is a common
cause, esta-
blished by
Sir G.
Baker.

* Tronchin de Colica Pict. p. 32.

† Treatise on Tropical Diseases, p. 527.

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

metropolis and other large towns; yet Dr. Bateman never saw an instance which was not decidedly traced to the operation of lead. A great proportion of house-painters and plumbers, he observes, have the disease at some period of their lives; and, in particular constitutions, a very minute quantity of lead will bring it on. Dr. Fothergill has recorded several cases, in which it took place in persons who painted in water-colours, and were in the habit of pointing the pencil in their mouths. In addition to these facts, it deserves notice that, in many specimens of cider, which were analyzed by Sir G. Baker, a small portion of lead was detected. And in the new rum of the West Indies, which excited the colic throughout several regiments, while others were totally free from it, Dr. Hunter discovered by analysis the presence of lead. This lead appears to be deposited after a certain time, and the rum loses its noxious quality.*]

Whether
pure water
will dissolve
lead in a
metallic
state.

The question was next started, and it has been started again in our own times, whether pure water, as well as acid wine, be not capable of dissolving lead in a metallic state; and, consequently, whether the community be not daily running a great risk of being poisoned by employing this metal in pumps and reservoirs? The public mind was for a long time very much agitated by this discussion, and Dr. Percival thought it right to institute a variety of nice experiments to allay the general apprehension, by showing that pure water is not in any respect a solvent of metallic lead.† Yet it was a course hardly necessary, since the daily use of lead in water-cisterns by upwards of a million of inhabitants in this metropolis, without any inconvenience whatever, was then, and still continues to be, the most decisive and satisfactory proof that can be afforded of the insolubility of metallic lead in rain or river water. Even saturnine lotions applied to the surface of the body have rarely, if ever, been found deleterious, although these also were at one time suspected of being highly mischievous. They may perhaps prove so in a few singular idiosyncrasies, but they do not affect mankind in general.

Whether
saturnine
lotions be
injuriously.

Atmosphere
impregnated
with lead
has pro-
duced the
disease.

Lead, however, so minutely divided as to impregnate the atmosphere with its effluvium, has frequently laid a foundation for the disease. But whether any preparation under the form of cosmetics has proved injurious I cannot undertake to say. The disease has certainly been produced by sleeping in newly-painted rooms, of which a striking instance occurred a few years ago to myself. The patient was a surgeon of highly distinguished character in this metropolis. When I saw him, at his particular request, he had been ill for a fortnight; and, the cause not having been suspected, his complaint was conceived to be obscure and anomalous. The symptoms, as they struck me, were evidently those of rhachialgia from lead; and upon pointing out to him my view of the case, I found that, about a

Illustrated
by a striking
case.

* See Med. Trans. vol. iii. and Med. Obs. and Inq. vol. v.; and art. COLICA, in Rees's Cyclopædia.

† Obs. and Exp. on the Poison of Lead, by T. Percival, M.D. 1767.

month antecedently, he had sent the whole of his family into the country, as his house was about to undergo a thorough repair in painting, while he himself remained at home and slept there. The cause was admitted and acted upon, but the disease had gained too much ground, and was immovable; his spirits became deeply dejected, and he fell a sacrifice in about two months from the attack.

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

In the *Medico-Chir. Trans.* is a case communicated by Dr. Badeley, in which the patient, a domestic in his own house, lost her speech and became paralytic from being only six hours in a newly-painted room, but quickly recovered from both upon being removed;* evidently proving the deleterious influence of lead in a state of vapour; and, at the same time, that in different constitutions it will show its effects upon different organs in a different manner.

Peculiar
effect on
some con-
stitutions.

Sir George Baker asserts, that he has known the disease originate from minute corpuscles thrown off from the clothes which have been worn by plumbers while at work.† And in corroboration of this remark, Dr. Reynolds observed, when he was physician to St. Thomas's Hospital, that the colic of all the workers in lead frequently returned, under any management whatever, whilst they were allowed to wear the clothes in which they had been accustomed to labour: on which account such clothes were never suffered to lie on the patient's bed. Sentin was a witness of the same effect from hanging up labourers' wallets, filled with food for the day, in places impregnated with the vapours of lead.‡ And the present author has occasionally met with other instances of the disease from an habitual residence in close damp rooms, filled with *newly-printed* or *coloured* paper: for the emanation of flake-white, which usually enters into the colour, seems to have the same power of affecting or being affected by the surrounding atmosphere, as that of lead in a finely attenuated metallic state.§

Other
examples.

I have said that pure water does not act upon lead in a metallic form: but while we see lead thus easily disintegrated and reduced to an oxyde or a carbonate by acids existing in the atmosphere, or even by the atmosphere itself, we may readily conceive, that aerated waters are capable of decomposing it in a slight degree, and of forming oxydes or salts that may be injurious to the health. And hence, where lead is required in the form of reservoirs for waters of this kind, or for culinary vessels, it should, by all means, be united with tin in equal proportions, as recommended by M. Prout,|| or with a slight surplus of the latter, as proposed by M. Vauquelin.¶ For, first, tin is a harmless metal, as well in its salts and oxydes as in its reguline state, at least in any quantity in which we can conceive it possible to be swallowed by mistake. And, next, as it is more readily oxydable, and has a closer affinity for all the acids than

Water, when
aerated,
capable of
dissolving
lead.

Hence
leaden re-
servoirs for
aerated
waters
should be
lined or
combined
with tin.

* Vol. ix. p. 238. See also Seguin, *Annales de Chimie*, lxxxviii. 263.

† Essay concerning the Cause of the Endemial Colic in Devonshire. 1762.

‡ Memorab. p. 114. § *Med. Trans.* vol. iii. p. 420. || *Annales de Chimie*, tom. lvii. p. 84. ¶ *Id.* xxxii. p. 243.

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

Lead, when united with the latter it must completely draw away all the acid it can come in contact with, and detach every atom of oxygen which might even previously have been united with the lead.

Medical
treatment.

Opium and
purgatives.

The paralytic effect produced by the action of lead is one of the most formidable symptoms to be encountered in the therapeutic process: in laying down which, our first efforts should not be different from those in the preceding species, excepting that, in an attempt to remove the spasmodic pain, opiates may be allowed to precede the use of purgatives. [*Colica pictonum* is attended with obstinate costiveness, and, therefore, one would be inclined to have recourse at once to the most active purgatives. The best physicians have differed, however, respecting the propriety of beginning with cathartics. Sir George Baker directs purgatives; Dr. Darwin and Dr. Warren opiates.* Dr. Bateman was also satisfied that, whenever colic could be decidedly traced to the operation of lead, the most effectual treatment is the administration of a large dose of opium, and repeated at short intervals until the pain and spasmodic stricture are relieved, after which the bowels may in general be easily opened, and the cure completed by tonics and cordials.] One of the latest and best writers on the subject, Dr. Pemberton, has recommended an union of castor oil and laudanum. Dr. Cheyne has generally succeeded in relieving *colica pictonum* by following Sir George Baker's practice; yet occasionally he has found it necessary to give opium, and that too in large doses, particularly when obstinate vomiting occurred. Dr. Pemberton† states, that, in some examples, opium itself will act as a purgative, as he supposes, "by resolving the spasmodic affection of the colon, by which the feces are locked up between its circular bands." And one critical writer recommends a large dose of opium with the same view, as after its exhibition the difficulty of procuring stools, he says, is not great.§ With Dr. Cheyne, however, a doubt may be entertained, whether the costiveness be owing to spasm. "From the tormina we know that there is excitement in some part of the canal; from the vomiting we infer inverted peristaltic action; but from the obstruction we can infer no more than torpor of a particular part, and, judging from the symptoms which afterwards occur, this torpor would appear to be paralytic." This view of the state of the canal enables us, without the aid of spasm, as Dr. Cheyne conceives, to understand how benefit results from opium. His plan is to administer purgatives in the slighter cases, and opium with purgatives and stimulating clysters, in the more severe ones.|| Fomentations to the abdomen, the warm bath, and emollient injections containing laudanum, are useful means; and venesection,¶ if signs of inflammation of any of the abdominal viscera be present. In cases produced by the vapour of

Fomenta-
tions, opiate
clysters, ve-
nesection.

* *Zoonomia*, vol. ii. and *Med. Trans.* vol. ii. † *Art. COLICA*, Rees's *Cyclopaedia*. ‡ *On Diseases of the Abdominal Viscera*. § *Edin. Med. and Surg. Journ.* vol. iii. p. 72. || *Op. cit.* vol. iv. p. 314.

¶ See Gregory's *Elements of Physic*, p. 513, 2d ed.

lead, Orfila says, the antiphlogistic treatment should be abandoned.*] The paralytic effect has been attempted to be subdued by the counteraction of other metals introduced into the system for this purpose: and especially mercury and silver. Both have, indeed, been given from the commencement of the attack by many practitioners; and, as themselves relate, with great success. Dr. Warren and Dr. Biss were in the habit of persevering in the mercurial process till they obtained a salivation; and assert, that they found the dull griping pain give way as soon as this was accomplished. The silver employed in rha-chialgia has usually been in the form of its nitrate, or lunar caustic, to the amount of four or five grains in the course of the day. Dr. Roberts has published two cases of a cure obtained by this remedy; the one, that of a young, the other of an old man. The cases were both of considerable standing, and the joints of the wrists were weak almost to paralysis. Even this symptom, however, yielded by degrees. The salt was given from three to five grains at a dose three times a day in the form of pills: and in the last case five grains every six hours. It has the advantage of being a laxative as well as an antispasmodic: so much so, that a small quantity of opium was on this account added to the nitrate when given in its most frequent doses.†

In treating of passive hemorrhage we shall have occasion to observe, that whatever deleterious property the acetate of lead may possess, it is entirely removed by a judicious mixture of opium with it, so as in this state of union to become a most valuable styptic. It is possible that, under the form of an acetate, lead may be less injurious than under some others, for it has not unfrequently been given alone in the same complaint without any rhachialgic pains where the bowels have been kept in a soluble state. But with opium every mischief seems effectually to be guarded against: and the beneficial influence of opium upon lead in this case should induce us to employ it, and that very freely, as an antidote in every case, and especially in the disease before us; and to counteract its constringency by an union with calomel. This rational practice, which has been pursued in our own country by several physicians, ever since Dr. Reynolds first called the attention of the profession to the corrective power of opium when combined with lead in the case of hemorrhage, has now for many years been also tried with success in various parts of the continent. In France the dose of opium has been usually only a grain or a grain and a half every night; but in Spain, as we learn from the memoirs of the *Real Academia Medica de Madrid*, a much bolder and more satisfactory employment of this medicine has been exhibited by a physician of distinguished judgment, Don Ignacio de Luzuriaga, who prescribed a grain of opium every three hours; and it will often be found necessary to augment this quantity.‡

GEN. VI.
SPEC. II.
Colica rha-
chialgia.
How far the
effects of
lead may be
opposed by
other
metals.
Mercury.
Silver.

Opium
highly ser-
viceable.

First
pointed out
by Dr.
Reynolds.

* Toxicologie, tom. i. p. 658. † Med. Trans. vol. v. art. v.

‡ Disertacion Medica sobre el Colico de Madrid, inserto in las Memorias de la Real Academia, &c. Madrid, 1796.

GEN. VI.
SPEC. II.
Colica rha-
chialgia.
Attempts to
reduce the
acetate to a
sulphate.

As the sulphate of lead is a compound insoluble in the stomach, and consequently altogether inert, M. Orfila ingeniously attempted to reduce the acetate and other preparations of this metal to the form of a sulphate, by giving large quantities of sulphate of magnesia; and he thinks he hereby succeeded in effecting a decomposition in the stomach of two dogs upon which he made experiments to ascertain this point; and in producing sulphate of lead in their stead. The experiments, however, proved fatal in both instances, though some portion of sulphate of lead seems to have been formed, and the death of the second dog to have been retarded. As the want of complete success may be ascribed to the want of a sufficiency of sulphuric acid in the re-agent employed, it would be better to try the experiment for the future by giving the purgative salt in infusion of roses, or any other liquid adequately charged with the acid to answer the purpose; or by a free exhibition of the acid in a diluted state alone.

[Alum was at one time a popular remedy for painters' colic, but it has not maintained its ground; a fact rather against the efficacy of the sulphate of magnesia, as the merits of both depend upon the same chemical principle. Where, however, the colic arises from the presence of recently swallowed acetate of lead in the alimentary canal, and not from absorption by the skin, the method suggested by Orfila, with Dr. Good's improvement of it, seems the most promising of any of the plans hitherto recommended for counteracting the poison of lead. In confirmation of this observation, the editor begs leave to remind the reader of a statement made by Dr. Paris; namely, that he has found, in the treatment of hæmoptysis, the effects of the acetate of lead quite invalidated by combination with alum, or by being prescribed with acidulated infusion of roses, or with small doses of sulphate of magnesia.*]

Oil of tur-
pentine :
of croton.

The best purgatives, where the costiveness is severe, are those impregnated with the principle of camphor, as the essential oil of turpentine; and where these fail, the oil of croton in doses of one or two drops in the form of pills.

[Two cases† of violent painters' colic soon yielded to the application of tobacco stupes to the abdomen, followed by the exhibition of cathartic pills, with croton oil, and of a purgative clyster. Tobacco injections are said to have been first recommended in this disease by Lentus.‡]

Patients
liable to
subsequent
paroxysms.

Those who have had this disease are liable for a long time to fresh paroxysms; and the slightest exposure to the same cause will be sure to reproduce it; yet the appearances in different persons, as well afterwards as during the attack, are extremely variable, from difference of idiosyncrasy: a correct idea of which may be best, perhaps, obtained from Dr. Warren's description of thirty-two domestics of the Duke of Newcastle's family, then residing at Hanover, who were all seized with

* See Pharmacol. vol. i. p. 338. 6th edit. † Dr. Graves, in Dublin Hospital Reports, vol. iv. p. 45. ‡ Memorabilia circa Aerem, vitæ genus, &c. Clausthalienium. Götting. 1779.

rhachialgia after having used, as their common drink, a small white wine that had been adulterated with some of the oxydes of lead. They were all attacked in the common way, except one, whose first assault was an epileptic fit. This patient, as soon as the pain in the bowels which succeeded to the fit had ceased, had his head again affected, was troubled with a St. Vitus's dance, and died epileptic in less than a fortnight. Three were feverish from the beginning to the end of the disease. The rest were without fever till the fourth or fifth day, their pulse becoming quicker as the pain began to abate. In some the mouth was made sore by the acrimony of the matter vomited up. Four fell into a salivation for several hours every day, and said that their pain was abated during the spitting. Many had profuse sweats, and a few an eruption of red and white pimples just before the disorder terminated. One was delirious during a part of the time, but recovered. All relapsed within four or five days after they seemed to be cured. Some relapsed several times for several years. One only was rendered permanently paralytic and costive.*

GEN. VI.
SPEC. II.
Colica rhachialgia.

The most useful means of guarding against a paralytic diathesis, or of removing the paralytic sequel, where recourse can be had to them, are the Bath waters. And where the circumstances of the patient will not allow him to have the benefit of these, the spine may be advantageously rubbed night and morning with the warm balsams or resins dissolved in spirits; and the common restorative process of air, exercise, friction, and tonic medicines should at the same time be had recourse to, and persevered in for many weeks or even months without remission. [According to Dr. Gregory, the continued use of aperients has great effect in preventing a relapse.† It is obvious, that the return of colica pictonum can never be effectually prevented, unless those avocations and beverages are relinquished, which exposed the patient to the influence of the poisonous metal by which the disease was excited.

Bath waters.

Stimulant embrocations to the spine.

Avoidance of exciting cause.

With respect to the paralytic affection of the hand and fingers, Dr. Pemberton found it much benefited by keeping these parts extended on a kind of hand-board, splint, or battledore. M. Magendie recommends, for the removal of paralysis, the use of strychnine, which has been successfully tried by Dr. Graves.‡]

Mechanical support of the paralyzed hand.

SPECIES III. Colica Cibaria.—*Surfeit.*

The pain accompanied with nausea, head-ache, and dizziness before Vomiting, and afterwards terminating in a Gripping Looseness.

I HAVE already had occasion to remark, that the stomach is one of the most capricious organs of the entire system; and hence we often find persons in an unsuspected state of health

Causes.

* Medical Transactions, vol. ii. p. 86. † Elements, &c. p. 514, 2d edit.

‡ Dublin Hospital Reports, vol. iv. p. 46.

GEN. VI.
SPEC. III.

Colica
cibaria.
Surcharge
of food.

Indigestible
husks or
kernels of
fruits.

Incongru-
ous food
in early
infancy.

The food
itself com-
bined with
some dele-
terious
principle.

Sometimes
septic,

sometimes
narcotic
and acrid.

Symptoms
of the two
sometimes
combined.

complaining, that even the ordinary meal, to which they are accustomed, sits upon it with a less degree of comfort and satisfaction than usual. And it is hence not at all to be wondered at that, when the stomach is overloaded with plain food, and still more with high seasoned dishes and heady malt liquors and wines, the pain and sickness of colic should ensue, and that those organs, which are in closest sympathy with the stomach, and particularly the head, should participate in the affection.

The same effect is not unfrequently produced by swallowing the husks, stones, or kernels of fruit with the fruit that is eaten, all which the stomach may at the time, or perhaps at all times, be incapable of digesting, and some of which have in a few instances remained so long as to germinate before their rejection; examples of which are given in the author's volume on Nosology.

When the stomach of the new-born infant is filled with any other food than its mother's first flow of milk, which is purgative and removes the viscid meconium with which the alimentary canal is gorged, tormenting pains of a like kind follow: and if much air be extricated, the infant is overpowered with flatulency; and the present species becomes connected with the ensuing, and exhibits the oppressive distention of wind-colic.

These are the common causes of the species before us, which is characterized by a greater or less intensity of the symptoms enumerated in the definition. But we often find it also originating after meals from causes that are more obscure, and with various other symptoms of a still more violent and distressing nature, as though the food itself had proved poisonous, or some poisonous substance had been intermixed with it. These additional symptoms are of two kinds: in the one, we meet with an intolerable sense of suffocation, the throat constricted, the face and eyes swollen, inextinguishable thirst, a burning heat all over the body, a quick small pulse, an intolerable itching or pricking in the skin, and an efflorescence on the surface, sometimes in the form of minute red millet-seed papulæ, sometimes in that of weals; twitching of the tendons, and a peculiar kind of delirium; the cuticle peeling off on the subsidence of the attack: the whole evincing great malignity of action, as though the cause were of a septic nature. Under the other set of symptoms, in addition to those noticed in the definition, we meet with great anxiety and difficulty of breathing, dejection of the spirits, spasms in the limbs, as well as in the abdominal organs and muscles, tenesmus, coldness of the extremities, loss of sight and hearing, convulsions or coma.

The symptoms, however, vary considerably according to the general nature of the constitution. For the most part, they are sufficiently distinct; but, in many persons, they are strangely united; and the lethargy, tenesmus, or coldness of the extremities, may be combined with the cutaneous eruption. And hence esculent colic may be justly contemplated as ramifying into the three following varieties:

| | | |
|--------------------------------------|---|--|
| α Crapulosa. Common surfeit. | The symptoms indicating an overloaded stomach, and usually ceasing on the evacuation of its contents. | GEN. VI. SPEC. III. Colica cibaria. |
| β Efflorescens. Eruptive surfeit. | The symptoms evincing a highly malignant acrimony, the skin covered with an efflorescence. | |
| γ Comatosa. Comatose surfeit. | The symptoms evincing great nervous irritation, with a rapid exhaustion of the sensibility. | |

In the FIRST OR SIMPLE FORM of the disease, the violence of the symptoms generally works its cure. But if the nausea should exist without vomiting, a simple emetic of ipecacuan should be given to excite the stomach to a more perfect inversion of its action, which should be followed the next morning by a brisk purgative. In the colic of new-born infants, from viscid meconium, the purgative alone will be sufficient, and the best medicine for this purpose is castor oil. If the congestion should proceed from an enfeebled state of the stomach, and too long a retention of the food in its cavity, it will be afterwards requisite to put the patient on a course of stomachic or general tonics, of which we have taken a sufficient survey in the preceding description of dyspepsy.

It is possible, that the SECOND VARIETY may occasionally proceed from a morbid irritability of the stomach operating upon a tolerably full meal of the most bland and innocuous viands; but it more generally proceeds from *animal* foods of a particular description, or eaten under particular circumstances, as comatose surfeit does from poisonous *vegetables* intermixed with common food. The animal substances that chiefly operate in the manner above described, producing a dreadful feeling of suffocation, swelling of the face and eyes, intolerable thirst, a burning heat on the surface, pricking or itching on the skin, succeeded by an eruption of some kind or other, and accompanied with the specific symptoms of griping pain, vertigo, and vomiting—are shell fishes, and fishes of a few other kinds, as muscles, which are perhaps the most frequent of all causes, some species of scallops and other coarse ostraceous worms, the land-crab (*cancer ruricola*), lobster (*c. gammarus*), conger eel (*muræna major subolivacea* of La Cépède), gray-snapper (*coracinus fuscus major*), and yellow-billed sprat (*clupea Thryssæ* Lin.), the baracuta, the king-fish, and several other species or varieties of scomber, as the bottle-nose and ambar, the smooth bottle-fish (*ostracion glabellum*), and the rock-fish (*perca marina* of Catesby). There are also many others, but these are sufficient as specimens.

As all these are among the edible productions of the ocean, and hence are eaten very generally as nutritious foods, it is a question of great importance, and which is yet open to discussion, what are the circumstances, in which they occasionally disagree with the stomach, and produce the above symptoms?

Under what circumstances they disagree with the stomach.

GEN. VI. It has been supposed by many pathologists, that the mischief
 SPEC. III. is occasioned by some poisonous property being conveyed into
 β C. cibaria the body of the fish in the form of food: by others, that it is
 efflorescens. the result of a change taking place in its general frame by the
 approach of the spawning season or some other period of life,
 or in consequence of its removal into a different climate: and
 by others again, that it depends altogether upon the idiosyncrasy
 or peculiar state of the constitution, or of the digestive organs
 of the persons that are thus affected.

Anatomical
 and chemi-
 cal exami-
 nation of
 poisonous
 muscles.

[From a very interesting paper by Dr. Combe of Leith, on the poisonous effects of muscles, we learn, that muscles which had produced such consequences, and had been taken from a wooden bar in the wet-dock, had no very positive mark, by which they could be distinguished from other muscles gathered elsewhere. His friend Dr. Coldstream was of opinion, however, that their livers were diseased, being darker and larger than natural. This disagrees with the investigations of Dr. Ferguson,* who arrived at the conclusion, that the deleterious effects are not connected with any organic change in the animal; but, as Dr. Combe has remarked, some change may happen in the structure or secretions of the animal, beyond the sphere of our detection. The animals were quite fresh, and had no peculiar smell nor taste. The most delicate chemical tests gave no indications of cupreous impregnation; nor could a comparative chemical analysis of the poisonous and healthy fish, undertaken by Dr. Christison, discover any peculiar principle in the former, or any difference in chemical nature between them. The poisonous effects of the muscles, gathered from the above wooden bar, were not confined to the human race, a cat and dog having also been killed by eating them, though other muscles, gathered in the vicinity of the dock, were eaten by such animals with impunity.† The supposition of a cupreous impregnation of the poisonous fish in the West Indies, has been ably refuted by Dr. Burrows.‡ The above particulars serve also to weaken the notion of putrefaction.]

Exotic poi-
 sons intro-
 duced into
 the stomach
 of fishes
 that disa-
 gree.

That many of the animals which prove thus noxious have derived their mischievous quality from some poisonous mineral, vegetable, or animalcule on which they have fed, seems probable from the well-known fact, that many of the most harmless and easily digestible species, if eaten without being disentrained, grievously disorder the stomach, and occasion many of the symptoms above noticed; while even the baracuta, which is ordinarily one of the most deleterious in its effects when eaten whole, becomes bland and innocuous to most persons when thoroughly cleaned, gutted, and salted. There is also, in many cases of the disorder hereby produced, a strong metallic and especially a coppery taste in the offending substance when rejected into the mouth, and which continues to affect the fauces for

* Edin. Phil. Journ. vol. i. † Dr. Graves on the poisonous effects of the muscle (*Mytilus edilis*), in Edin. Med. and Surg. Journ. No. 94, p. 86.

‡ London Med. Repository, vol. iii. p. 443.

a long time afterwards; [though, as is above related, no copper can be detected in poisonous muscles.] M. Orfila has accurately noticed this last symptom in several of the cases he has enumerated; and especially in an example of this disorder originating in a mixed company of whites and blacks, who had fed on the conger eel, in the island of Grenada, in April 1791. "The negroes," says he, "suffered more than the whites; they all experienced a coppery taste in the mouth, and a sensation in the œsophagus, as if it were excoriated."*

GEN. VI.
SPEC. III.
β C. cibaria
efflorescens.

It is in vain to urge, that what is thus poisonous to man, must have been at least as noxious to the animals that fed upon it: for poison is a relative term, and it is highly probable, that there is scarcely a vegetable or mineral substance but may be eaten, I do not say harmlessly, but even as a safe and nutritious food by animals of some kind, however destructive to others. The land-crab is well known to feed on the manchineel tree (*hippomane mancinella*); the loxia or gross-beak of the Bahamas on the fruit of the *amyris toxifera*, or poison-ash; partridges on the leaves, and bees on the flowers of the *kalmia latifolia*, which are death to sheep, to horned cattle and to man. So the *cicuta virosa*, or long-leaved water-hemlock, the most virulent plant that grows spontaneously in England, though fortunately not very common to our pastures, is fatal to cows, while sheep and horses eat it with impunity, and goats devour it with greediness; a fact well known, nearly two thousand years ago, to the first naturalist of ancient Rome, and thus fully described in his poem, *De Rerum Naturâ*:

Why not
injurious to
such fishes
themselves.

—Videre licet pinguescere sæpe CICUTA
Barbigeras pecudes, homini quæ est acre venenum.†

On the contrary, while horses feed with avidity and thrive to fatness on the *agrestis arundinacea*, or reed bent-grass, Linnæus, as he tells us in his *Travels in Shäne*, found a number of goats perishing in an island in which this was the chief herbage.

This interesting subject is pursued with great spirit, and high advantage to the most important purposes of practical husbandry, in several articles published in the *Swedish Amœnitates Academicæ*; which give us tables of the best and most agreeable foods for cattle and other domestic animals, deduced from an exercise of that wonderful instinctive power of selection, which enables them to discern and to crop those that are a nutritious food for their own species, and to reject the rest. By one of these tables it appears, that, of four hundred and ninety-four species of indigenous plants of Sweden, three-fourths of them common to our own country, which were offered to horned cattle, two hundred and seventy-six were eaten, and the rest refused; that goats, out of four hundred and forty-nine species, rejected a hundred and twenty-six; sheep, of three hundred and eighty-seven, would not touch a hundred and forty-one; horses turned away from two hundred and twelve out of two hundred

Subject pursued with
great spirit
by various
Swedish
physiologists.

Their general result.

* *Traité sur les Poisons*, &c. tom. ii. sect. 1006.

† *Lib. v.* 897.

GEN. VI.
SPEC. III.

β C. cibaria
efflorescens.

and sixty-two; and swine, out of two hundred and forty-three, made choice of only seventy-two.* In another volume of the same interesting work, we have a like series of experiments on a great diversity of insects and worms, with a view of ascertaining how many of them are devoured or rejected by our common poultry;† to which, however, I can only refer, and must leave the reader to consult it at his leisure.

It is hence perfectly clear, that no argument against the existence of esculents in the interior of animals, deleterious to the health of man, can be drawn from the position, that such esculents must also prove noxious to the animals that feed on them.

Some fishes
deleterious
from season
or period of
life.

Examples.

It is at the same time well known, that a considerable change takes place in the taste and nutritive qualities of many species of fishes, at various seasons and periods of life, by which they are divested of their nutritive power, and are rendered far less easily digestible; and which consequently lays a foundation for various affections of the stomach. This is particularly the case with the more luscious or oily kinds; as the herring, mackarel, eel, and salmon, all of which are unwholesome, if not pernicious, when out of season. We may also reasonably conclude, that climate has a considerable influence upon them, since the most pernicious species are those that exist in the intertropical seas.

The disease
often de-
pendant
upon idio-
syncrasy, or
a temporary
state of the
stomach.

It is, however, equally certain, that the disorder before us is, in many instances, rather dependant upon idiosyncrasy, or a peculiar condition of the stomach at the time, than upon any quality essentially noxious in the fish itself: for out of twelve or more persons dining together from the same diet, we often find only a single individual affected with the disease before us, while all the rest not only escape, but have made a nutritious and a healthy meal. Even in the same family we occasionally meet with almost as many distinct idiosyncrasies in this respect as there are individuals. Of three sisters, M. Orfila tells us, that one was incapable of eating muscles, at any time, without great disorder of the system at large, as well as of the stomach; that the second experienced a like effect from herrings; and the third, from feeding on strawberries. And hence many pathologists have been induced to ascribe every case of colic, from the variety of surfeit before us, to idiosyncrasy alone. But the frequent examples we meet with of the affection extending through every individual of a large party that has fed on the same food, forbid us to limit our ascription of the disease to this single cause. [The symptoms caused by poisonous muscles are carefully detailed by Dr. Combe. In general, an hour or two elapses before any ill consequences are felt; and then the bad effects consist rather in uneasy feelings and debility, than in any complaint about the stomach. In two or three hours, however,

Symptoms
produced by
poisonous
muscles.

* Vol. ii. art. 25. Pan Suevicus. Resp. N. L. Hesselgren. 1749.

† Vol. viii. art. 163. *Esca avium domesticarum.* Resp. P. Holmberger, 1774.

a slight tension of the epigastrium is complained of. Cardialgia, nausea, and vomiting, occasionally take place, but not generally, nor for any considerable time. A prickly feeling in the hands; heat and constriction of the mouth and fauces; some difficulty of speaking and swallowing; numbness about the mouth, gradually extending to the arms; and great debility of the lower limbs; are the ordinary symptoms. Some patients have a bad or coppery taste in the mouth. In the abdomen, a slight pain is experienced, which is increased by pressure, particularly in the region of the bladder, the functions of which are variously disturbed. In some patients, the secretion of urine is suspended; in others, it is free, but passed with pain and effort. The action of the heart is feeble; the breathing unaffected; the countenance pale and anxious; the skin cold; the mental faculties unimpaired.*]

GEN. VI.
SPEC. III.
β C. cibaria
etiflorescens.

The principles of cure are of easier comprehension than the etiology. The peccant matter must first be discharged from the stomach by an emetic of rapid action, as about half a scruple of white vitriol; shortly after which, the lower belly should be stimulated to a like discharge, so that as little of the material as possible that disagrees with the digestive organs may remain in them. The history of the symptoms shows us, that the living power is rapidly, prodigiously, and sometimes alarmingly exhausted, whence indeed, in many cases, the tremors, sense of suffocation, faintness, sinking of the pulse, and general depression of strength; as also the swellings that take place through every organ where the cellular substance exists in considerable abundance. It is hence highly important to rouse the system with all speed, by means of the most diffusible stimulants, and warmest cordials and tonics, which may be commenced as soon as the stomach has been evacuated; the most useful of which are sulphuric ether, nitrous ether, ammonia, capsicum, and vinegar diluted with water, sweetened and drunk in abundance. The acids obtained by fermentation answer better in this case than any others, because they possess more of an alcoholic principle. And it is truly striking to notice the almost miraculous power which is sometimes exhibited by this cordial plan of attack. Upon the administration of a single strong dose of ether, the patient, apparently in the act of expiring, has in various cases felt all his symptoms vanish in a very few minutes as by enchantment;† the pains have ceased; the absorbents, and indeed every other set of organs, recovered their wonted energy; the general intumescence has subsided, and the nettle or other rash disappeared. If, however, the system have been shaken more deeply, and the symptoms do not yield with much readiness, the tonic plan must be persevered in for many days or even weeks.

Principles
of cure.
Emetics and
cathartics.

Diffusible
stimulants,
and cordial
tonics.

Their rapid
benefit in
some cases.

The THIRD VARIETY is usually produced by pernicious vegetables, instead of animals, that have been taken for food, or

γ C. cibaria
comatosa.

* Dr. Combe, in Edin. Med. and Surg. Journ. No. 94, p. 89.

† Orfila, tom. iv. sect. 1008. Dulong, Gazette de Santé, Oct. 1, 1812.

GEN. VI.
SPEC. III.

γ C. cibaria

comatosa.

Commonly
from noxi-
ous vegeta-
bles.

Symptoms.

Fungi the
most com-
mon cause.

Sometimes
the edible
mushroom
itself a
cause.

Cautions in
gathering
mushrooms.

Other vege-
tables than
fungous
plants.

along with food; or esculent vegetables that disagree with the stomach, as in the preceding variety, from a morbid state of this organ, or from a peculiarity of constitution. I have already observed, that the symptoms in this modification of the disease evince great nervous irritation with a rapid exhaustion of the sensibility. There is severe spasmodic pain in the intestinal canal, with cramp, spasms, or convulsions, extending over the system more or less generally, accompanied with or succeeded by a lethargic drowsiness, from which it is often difficult to rouse the patient; and from which, also, when roused, he instantly relapses into convulsive agitations: evidently proving that an acrid and a narcotic principle are combined in the unsuspected cause. This cause is usually mushrooms or rather deleterious funguses that have been mistaken for the genuine edible mushroom, or *agaricus esculentus*. The agaric is so extensive a genus, and many of its species to an unpractised eye have so near a resemblance to each other, that it cannot be wondered at that such a mistake has been committed: though perhaps the plants that, through such an error, have been most frequently gathered, are the bulbous agaric, the Medusa's head, the raven's eye, the hemlock-mushroom, and the *agaricus muscarius*. It is possible, indeed, that even the genuine mushroom itself may prove deleterious to some idiosyncrasies, or to some stomachs in a morbid state of constitution; but then the mischief is in almost every instance confined to an individual alone, the rest of the company eating of the same dish with satisfaction and pleasure.

As there is no critical mark to determine at once between poisonous and salutary mushrooms, we may lay it down as a general rule, that those should be suspected and avoided that grow in moist and marshy grounds, and especially in the shade; that have a dirty looking surface, and whose gills are soft, moist, and porous. For the most part the smell of these is virulent, and they are covered with a calyptré or veil.

There are, however, a considerable number of other vegetables that produce a like effect when taken by accident for food, or along with food; as the *cicuta virosa*, or water-hemlock, the leaves of which have been mistaken for smallage, and the tap-roots for parsnips; the *æthusa cynapium*, or fool's parsley, which has been culled for common parsley: and the *secale cornutum*, or spurred rye. The last is productive of very serious evils in different forms, and we shall hence have occasion to return to it when describing erythematic pestis, and mildew-mortification, both which also result from its use. Rye becomes spurred or horned in the shape of its ear, apparently from having numerous punctures made by different insects in the fresh pullulating grains of the glume as a nidus for their minute eggs, in the same manner as the nut-weevil (*curculio nucis*) pierces the young and tender nut of the hazel for the same purpose. And as the effects, produced by the grain thus diseased, are very different in different seasons or climates, we have reason to believe that its juices are themselves rendered noxious in a different manner

according to the species of insect that makes the attack. It is also said that the common garden rue (*ruta graveolens*), when eaten to excess, is succeeded by the same symptoms of ventricular pains, spasmodic action and coma, though in a less degree : but I have never seen such consequences, and have reason to think that they have been overrated.

GEN. VI.
SPEC. III.
γ *C. cibaria*
comatosa.

Most of these symptoms are also produced by feeding on soups, or other dishes, that have been cooked in copper vessels containing verdigris. We have the same violent gripings and muscular commotions, excited by the acid quality of the plant just noticed, and in almost all instances headach and confusion of intellect, and sometimes coma. In all these cases, however, we can easily detect the nature of the poison, by the intolerable coppery taste of the mouth, and the green or greenish-yellow colour of the matter rejected from the stomach.

Dishes
cooked in
copper
vessels.

The cure, as in the preceding variety, must be promoted by evacuating, in the first instance, the poisonous principle, as largely as possible, from the stomach. Where the local irritation is great, demulcent mucilages should succeed : or soap where the effect has been produced by salts of copper. After which, if there be much general convulsion or other irritation of the nervous system, it must be allayed by opiates.

Medical
treatment.

SPECIES IV. Colica Flatulenta.—*Wind-Colic.*

Pain acute, extending to the pit of the stomach, often impeding respiration ; accompanied with great fulness and flatulency ; and relieved by pressure, bending the body forward, or expulsion of wind.

This species is produced by crude and flatulent fruits, and whatever lowers the tone of the alimentary canal ; as too long fasting, fear, or grief, and all the causes of dyspepsy, with which it is often complicated, and to which the reader may turn. Like dyspepsy, indeed, it seems to depend upon local debility, whose seat is in the small intestines, and consequently in the direct neighbourhood of the stomach. It is often accompanied with great costiveness, from the spasmodic action, which runs, in a larger or less degree, through the whole of the intestinal canal, and considerably adds to the torture, and increases the tumefaction and tenseness of the abdomen ; which are sometimes so extensive as to resemble *emphysema abdominis*, or tympany.

Causes.

The last symptom is peculiarly striking and oppressive in persons of an hysteric diathesis, who are attacked with this complaint from very slight causes ; and with whom it is often combined with syncope, or clonic spasms of various kinds.

In attending to the means of cure, we may here proceed at once with some degree of boldness ; since, notwithstanding the violence of the pain, it is not often that inflammation is to be apprehended, at least in the commencement of the disease : and hence the warmest carminatives, and even alcohol, may be had recourse to : for whatever will carry off the flatulency, will carry off the pain and costiveness. Hence a spoonful of brandy, or,

Medical
treatment.

GEN. VI.
SPEC. IV.
Colica flatu-
lenta.

which is better, a dose of tincture of rhubarb, volatile alkali, infusions of herbs containing essential oils, as mint, pepper-mint, penny-royal, are generally consoling and salutary. For the same reason, the aromatic spices may be had recourse to with success, and particularly in connexion with opiates. Of the spices, the nutmeg, on account of its greater volatility than most others, and especially on account of its established reputation for producing quietism and even sleep, as I have already had occasion to observe when treating of dyspepsy, has a peculiar claim to attention.

Opium how
far useful.

The only disadvantage of opium is, that it has a tendency to diminish the intestinal, and indeed all the secretions, excepting that of sweat: and, on this account, it has been objected to by many physicians: but, from its power of allaying spasmodic irritation, and consequently of producing ease, it becomes of so much importance that it ought unquestionably to be called into use: and there are cases in which, from this very power alone, it may indirectly act the part of an aperient. The opiate confection, as combining an aromatic with a narcotic principle, is a highly valuable as well as an elegant preparation. And after the pain has subsided, an active purgative, according to the course recommended by Dr. Cullen,* may be administered with great advantage.

Opium may also be given in the form of an injection, which should not exceed five or six ounces, for otherwise it will probably be thrown back. It will be often of great use to unite with the narcotic a pretty free dose of turpentine, or some of the warmer balsams, especially that of copaiba; and to apply rubefacients to the epigastric region.

The convalescent treatment may be the same as already recommended under dyspepsia.

SPECIES V. Colica Constipata.—*Constipative Colic.*

The griping pain severe; the costiveness obstinate; great tension, with little flatulency; the vomiting sometimes accompanied with feces; the costiveness with bloody strainings; terminating, where not fatal, in a free defecation of the infarcted matter.

THE pain is here produced by indurated meconium, or feces, or other intestinal concretions, and especially those which are known by the name of bezoards, and will be hereafter described under the genus ENTEROLITHUS: and we hence obtain the following varieties:

- | | |
|----------------------------|------------------------------|
| α Meconialis. | From viscid meconium. |
| Colic of new-born infants. | |
| β Fæcosa. | From indurated feces. |
| Stercoraceous colic. | |
| γ Enterolithica. | From bezoards, and other in- |
| Stony colic. | testinal concretions. |

* Mat. Med. vol. ii. p. 249.

The first two of these varieties are the result of a superabundant action of the intestinal absorbents, or of a deficiency in the peristaltic power of the intestinal tube; in consequence of which, from the length of time the confined materials occupy in completing their descent, the meconium in infants becomes so viscid as not to be urged downwards, and remains in the intestines till it grows acrid from acidity or putrescency: and the feces of later life, exhausted of moisture, hardened into one solid mass, possessing the figure of the intestine; or, separating into smaller pieces, appear, when discharged, in the shape of balls or buttons, often as hard as sun-burnt clay, and have been called, though not quite accurately, *scybala*; yet sometimes they make a near approach to this substance, and consist of masses of indurated feces, combined with a certain portion of mucus or oleaginous matter secreted into the intestines, and producing a cetaceous or soapy feel.

Of the stony variety, the following is an extraordinary example related by Dr. König, of Bern, and inserted in the *Philosophical Transactions*.^{*} A young woman of twenty-five years of age, by name Margaret Lawer, after an anomalous and general disorder, discharged continually the contents of the intestines, and even the clysters that were injected, by the mouth, and at length a number of stones as hard as flint, some in fragments, some of the size of peas, others of that of filberts. A clashing of stones against each other was felt by pressing the hand upon the abdomen: there was great constipation, severe gripings, and dysury; and the urine, when voided, was often loaded with a gravelly matter. The aliment and injections being constantly returned by the mouth, Dr. König desisted for four months from offering her either meat, drink, or medicine of any kind, excepting occasionally a spoonful of oil of almonds. Blood was now and then vomited, from the violence of the spasmodic action of the stomach; and frequently urine to the amount of three or four ounces at a time, of a strong taste and smell. The disease seems to have lasted with remissions from January 1681, to February 1683, at which period the history is abruptly dropped, though the patient seems to have been in a state of recovery. It was preceded by the appearance of vesicular eruptions on the skin, and was probably produced by their repulsion. The chemical examination of the calculi is loose and unsatisfactory.

The oleaginous purgatives, soap injections, and mucilaginous diluents, to diminish the irritation of the intestinal absorbents, will here be found most successful. Small doses of neutral salts, sulphur, and acidulated drinks, may also be of service in promoting the latter intention. If the griping be severe and the case urgent, terebinthinate injections, in the last two varieties, will also be highly expedient, and not unfrequently produce speedy relief. In these cases, the injections should be copious, so that the fluid may readily insinuate itself between the imprisoned matter and the coats of the intestines: and the turpentine should not be less than from half an ounce to an ounce, dili-

GEN. VI.
SPEC. V.

Colica constipata.

Two first varieties dependant on the state or action of the intestinal absorbents.

Example of third variety.

Process of cure.

^{*} Phil. Trans. year 1686.

GEN. VI. gently triturated with yolk of egg, so as to be perfectly diffused
SPEC. V. and suspended in the menstruum. "Thus prepared, we have found it," says Dr. Cullen, "to be one of the most certain laxatives that can be employed in colics and other cases of obstinate costiveness."*

SPECIES VI. Colica Constricta.—*Constrictive Colic.*

A sense of stricture in some part of the intestinal canal; often of flatulency, gradually passing off by the stricture; the bowels tardy; discharging with difficulty small liquid stools.

How distinguished from proctica callosa.

THIS species bears a near approach to *proctica callosa*, or the callous contraction of the rectum; which last, however, as accompanied with less griping and flatulency, and consequently having less of the character of colic, and more particularly from its being in most cases within the reach of manual examination and surgical aid, and capable of assistance by a different mode of treatment, is entitled to a distinct consideration.

Symptoms.

[As Professor Monro observes, stricture of the intestines, in the early stage of the disease, gives rise to colic pains, and costiveness, alternating with bilious diarrhœa. After some time, solid feces are very rarely passed, and only after a great effort; and they are of an extremely slender calibre.]

Proximate cause.

The proximate cause of the disease before us is a permanent stricture existing in some part of the intestinal canal beyond the reach of the finger, from callosity, scirrhusity, a ring of tubercles or caruncles, or whatever else has a tendency to thicken its coats and diminish its diameter. [Strictures are more frequently met with in the colon and rectum, than in the small intestines; and Dr. Monro has seen the natural diameter of the colon so much reduced, that an ordinary quill would hardly pass the constriction. When the stricture is great, the bowel is generally enlarged above it,† and even ulcerated. Sometimes, indeed, it gives way; its contents are effused; and the patient, after labouring under colic for a few hours, is suddenly seized with very acute pain in the abdomen, rapidly followed by a sudden sinking of the pulse, cold sweats, and death.‡ When scirrhus affects the bowels, the diseased portion of the tube is always rendered narrower, and sometimes nearly impervious. According to Meckel, the disease begins in the peritoneal coat and glandulæ muciparæ, whence it afterwards extends to the muscular and villous coats. The effect of it is to confound together all the tunics, to thicken and harden them, and, in the end, to produce cancerous ulceration.§ The muscular coat is also subdivided by membranous septa, and the internal one sometimes projects in the form of hard irregular folds. In persons of advanced age, scirrhus of the large intestines is not uncommon,

* Mat. Med. vol. ii. p. 181. † Baillie's Works, by Wardrop, vol. ii. p. 153. ‡ Morbid Anatomy of the Human Gullet, &c. p. 301, 302.
§ Bourdon, Revue Méd. Mai, 1824, and Meckel, Manuel d'Anat. t. iii. p. 443.

and it mostly attacks the sigmoid flexure of the colon, or the rectum. The reason of this fact is referred by Dr. Baillie partly to the villous coat of the lower end of the great intestines containing many glands, and partly to the sigmoid flexure of the colon being naturally its narrowest part, and most liable to be irritated by the passage of hard substances. But, though strictures are most frequent in the colon and rectum, they are sometimes met with in the small intestines. In the Museum of the University of Edinburgh is a specimen of a stricture, extending seven inches along the ileum.*

GEN. VI.
SPEC. VI.
Colica con-
stricta.

Besides the foregoing scirrhus disease, by which the intestinal tube may be obstructed, there are other morbid alterations by which the same consequence may be produced. One is an elevation of the mucous membrane into thickened folds by an accumulation of the cellular membrane.† Another is a thickening of the mucous or villous coat alone, coagulable lymph being effused upon it. In the collection of Mr. A. Burns is a specimen, taken from a child, where a gelatinous substance, mixed with coagulable lymph, adhered very intimately to the villous coat of the sigmoid flexure of the colon and the rectum; and above the sigmoid flexure, the intestine had given way. In some instances, the intestine is completely filled with coagulable lymph, which may either be voided by stool, or remain and prove the cause of death.‡ The intestinal canal, and particularly the colon and rectum, are sometimes the seat of polypi, or of various other excrescences, some of which are hard and solid; others, spongy, loose, and soft.§ One is termed milky by Professor Monro, and has a very fetid smell: Meckel expresses a conviction that the disease here alluded to is in reality fungus hæmatodes; but on this point he must be mistaken. The case is rare, and has never been seen by Mr. Wardrop.||]

The colon and rectum, highly sensible in a state of health, are peculiarly irritable from the diseased action, and the specific symptoms are the consequence of irritation produced by the mechanical pressure of the feces; and often by acrimony from their retention. In most cases, the stricture lies beyond the reach of topical applications. [Purgatives afford but temporary relief.¶] The cicuta has, of late, been chiefly trusted to in conjunction with the mercurial pill. But I am not aware, that in any case these have proved decidedly advantageous. The spasmodic attacks must be encountered by the remedies already recommended in spasmodic and flatulent colic: and the habitual uneasiness felt in the intervals will be best alleviated by a rigid attention to a light, liquid, and aperient diet. Unfrequent as this disease is in general practice, I happen to have at this time two patients labouring under it: one a lady of about thirty-five years of age, who has been subject to it for ten years, and is incapable of passing feces more voluminous than those of an infant; and the

Remedial
process.

* Monro, op. cit. p. 301.

† Baillie's Works, vol. ii. p. 159.

‡ Monro's Morbid Anatomy, &c. p. 119—122.

§ Meckel, op. cit. p. 444.

|| Baillie's Works, vol. ii. p. 161.

¶ Monro's Morbid Anat. of the Human Gullet, &c. p. 302.

GEN. VI.
SPEC. VI.
Colica con-
stricta.

other a man, forty-nine years old, who has laboured under the disease for twenty-one years, and can never pass a motion larger than a crow-quill. Yet, by strict attention to diet, both are able to exist with only occasional inconvenience and pain; the last married about two years since, and his wife has lately brought him twins. He lives upon liquids altogether.

[As the sigmoid flexure of the colon, near its termination in the rectum,* is frequently the seat of the disease, Dr. Willan has very properly recommended, that this part should be carefully examined in every case of total obstruction of the bowels, not arising from hernia. It is requisite for the purpose, says he, to employ a bougie thirteen inches long, and of a proportionate strength. He adds, "I lately saw a lady thus relieved, who had been twenty-six days without any evacuation from the bowels, and who seemed nearly exhausted by violence of pain and distention of the abdomen, hiccough, cold sweat, &c. It is remarkable how long patients subsist under these distressing circumstances. In one instance, the time was twenty-nine days; in another, thirty-three days. As the latter patient recovered, after enduring every torture such a disorder could inflict, practitioners may be encouraged to persevere steadily in their attentions."† When this species of colic depends upon the presence of a polypus, or other excrescence in the intestinal canal, beyond the reach of surgical means, the palliation of symptoms is all that can be attempted. The true nature of such cases is scarcely ever ascertained till after death.]

GENUS VII. COPROSTASIS.—COSTIVENESS.

Obstinate retention of the Feces in the intestines.

THE generic character is expressed in the generic name, which is a compound term importing emansion or retention of feces—*κοπροστασις* from *κοπρος* and *ιστημι*, whence the well-known and apposite terms *copragoga* and *eccoprotica*, to express purgatives, or such medicines as quicken the passage of the feces.

Whether mere tardiness of evacuation should always be regarded as a disease may be questionable: some persons are accustomed to have their bowels moved not oftener than twice a week; and to such, a week's costiveness is attended with no inconvenience. [As Dr. Bateman‡ has remarked, the proximate cause of constipation of the bowels may consist in an unusual slowness of the peristaltic motion, or in an obstruction to the passage of the feces, while the proper peristaltic motion continues to propel them. The natural motion of the bowels is considerably different in individuals of different constitutions, and even in the same individuals at different periods; so that it is not easy to say when the peristaltic motion can be considered

Whether
costiveness
be always
a disease.

* See Mr. Penkivil's case, in *Edin. Med. and Surg. Journal*, No. 72.

† Willan on Diseases in London, p. 185.

‡ Rees's *Cyclopædia*, art. *COSTIVENESS*.

as preternaturally slow, while the general health continues good. But it is probable, that, in most habits, a stool should occur once in twenty-four hours, although many persons retain their feces much longer without inconvenience. Dr. Cullen believed that every deviation from a diurnal stool is an approach to an unnatural state.] Rhodius gives a case of feces retained nearly a month;* and Panarolus, one of three months' retention without mischief.† Chaptal relates the history of a female who for four months had no discharge either from the bowels or the kidneys, and as little evacuation by sweat, notwithstanding that her diet was confined to milk-whey and broths. She was at length cured by using the cold-bath for eight days successively. When but a very small quantity of food is taken habitually, the egesta bear a like proportion, are small in amount, and usually slender in volume. This is particularly the case with those who are enabled to endure long periods of fasting, as we have already had occasion to observe under *Limosis experts protracta*: and hence the collectors of medical curiosities have furnished us with various examples of feces retained for half a year,‡ two years,§ and in one or two instances not less than seven years,|| without serious mischief.

GEN. VII.
Coprostasis.

In those
who eat
little.

In all such cases, the feces are discharged in indurated and minute balls, something like sheep's dung. But it does not always happen that those who labour under this affection eat sparingly. Professor Thomassini of Parma, in 1808, attended a man, thirty years of age, who laboured under an habitual costiveness of this kind, though his appetite was good, and he was accustomed to eat twice as much as other men. He had been costive from his youth, but the torpor of his bowels had increased yearly. From his twentieth to his twenty-fourth year, he had had only one evacuation every eight or ten days, which interval was afterwards increased to twelve. At thirty, when M. Thomassini saw him, his intervals were extended to twenty-two days. No regimen or medicinal process had produced any benefit. Purgatives, indeed, operated, but occasioned such debility that they could not be persisted in. The heat was natural but the pulse frequent.¶

Yet some-
times occurs
in great
eaters.

[A very remarkable case has been published by Dr. Cramp-ton. The patient was a female in her 37th year, who had had no evacuation from her bowels for eight months, and only two or three motions in the year preceding that in which the particulars were drawn up. She also passed scarcely any urine, and this with pain. Her usual sustenance was tea, toast, milk, and gruel. The abdomen was free from fulness or swelling. In the intervals of meals, she often voided from the stomach matter of stercoraceous quality, and sometimes of an urinary smell.** The same physician refers also to another similar ex-

Case of only
two or three
motions in a
year.

* Cent. II. Obs. 61. † Jatralog. Pentecost. I. Obs. 1. ‡ Salmuth, Cent. I. obs. 24. II. 65. 98. III. 26. 45. § Samml. Medic. Wahrnehmungen, band iv. p. 294. || N. Samml. Med. Wahrnehm. band i. p. 423.

¶ Dict. des Sciences Médicales, art. CAS. RARES.

** See Dublin Hospital Reports, vol. iv. p. 305, &c.

GEN. VII. ample which was under his care, and in which a stool was considered quite an extraordinary occurrence. After death, the colon was found immensely distended, nearly impervious at its lower part, and the bladder diseased. In the first of these two cases, a stricture of the colon is likewise suspected.]

May become a cause of colic and flatulency, but when simple, merely troublesome.

Costiveness is not necessarily connected with colic, flatulency, or any severe pains; though, as already observed, under particular circumstances, it may become a cause of all these. In its simple and constitutional form, it is generally rather a troublesome, than a violent or dangerous complaint. But this is not invariably the case; and a constipated state of the bowels, whether idiopathic, or the concomitant of other diseases, is frequently highly injurious to the constitution; producing, when it is idiopathic, a variety of disorders; and aggravating, when symptomatic, the diseases of which it is a symptom. Costiveness may proceed from two very distinct sources; and as each of these possesses symptoms of its own, and is considerably discrepant from the other, we are enabled with ease to contemplate the genus under the two following species:

- | | |
|----------------------------|---------------|
| 1. COPROSTASIS CONSTIPATA. | CONSTIPATION. |
| 2. ————— OBSTIPATA. | OBSTIPATION. |

SPECIES I. Coprostasis Constipata.—*Constipation.*

The feces when discharged congestive and voluminous: the temperament firm and rigid.

In persons of a compact and robust habit, with hearty appetite and strong digestive powers, the intestinal absorbents occasionally evince an excess of action; and the feces, while they become hardened in consequence of such action, assume, from their copiousness, the figure and volume of the large intestines through which they pass.

Occasional causes.

The increased action of the absorbents, which is the common proximate cause of the present species, may be produced by violent exercise, which heats the blood and throws off an excess of fluid in the form of perspiration from the surface; or by too stimulant a diet, particularly of rough port-wine. [Travelling in a carriage, or on the water, is said to have greater effect in bringing on costiveness, than more considerable bodily activity. The editor is inclined to believe, that it is rather the confinement, and the want of usual exercise, which should here be regarded as the cause of costiveness; and that the complaint may be imputed, with more probability, to a defective state of the biliary and other abdominal secretions, and to inefficient peristaltic motion, than to an increased action of the intestinal absorbents. Dr. Cullen ascribed costiveness, in such cases, to the abstraction of the intestinal fluids, secreted from the mucous glands and exhalant arteries.† With respect to horse-exercise, the

* Materia Medica, vol. ii. p. 496.

editor suspects that the accounts of its producing costiveness are founded on a mistake, and that it generally promotes regularity in the functions of the bowels, provided its beneficial operation be not counteracted by intemperance. Many persons who are in the habit of riding, are also in the habit of drinking port, brandy and water, and other astringent heating beverages; and if they suffer from costiveness, the exercise on horseback bears the blame that ought to be laid upon their diet.]

Costiveness may be the result of too astringent a diet; as where bread, for instance, is adulterated with a considerable quantity of alum: for the mouths of the secernent vessels of the intestines, which should pour forth a large portion of fluid, become hereby contracted, and secrete but a small proportion. Astringents, also, by giving some degree of rigidity to the muscular fibres of the intestines, retard the peristaltic action, and thus become a second cause of constipation.

As the feces are forced forward by the peristaltic action of the intestines, it is obvious that, whenever this action is weakened, there must necessarily be a retardation, and consequently an accumulation of the feces. This sluggishness or torpidity of the bowels is produced by various causes: for sometimes the food is too insipid and destitute of stimulants, and sometimes there is a deficiency in the secretion of bile, which appears to be a natural stimulus to the internal surface of the intestines; and we have reason to believe, that the latter is sometimes secreted with its qualities imperfect; and sometimes, also, the muscular fibres of the larger intestines lose a considerable degree of healthy irritability, and are reduced to an extreme of paresis that amounts almost to paralysis. And, if this occur, as it does occasionally, without much failure of the appetite, the accumulation of feces will be in some instances prodigious. In the case of a young woman aged twenty-eight, the distention of the abdomen from this cause was so general as to be mistaken for pregnancy, especially as there was occasional sickness, with menstrual suppression, and a sympathetic enlargement of the breasts. The disease terminated fatally in about three years from its commencement. The colon, which was among the late Mr. Taunton's preparations, he was so obliging as to show me: it measured in circumference more than twenty inches, and on dissection was found to contain three gallons of feces.

[The causes which may obstruct the passage of the feces, without any deficiency of peristaltic action, occur either in the intestines themselves, or the neighbouring parts. In the intestines, a mechanical impediment is sometimes occasioned by a thickening of the coats, which straitens the passage, or by scirrhous tumours, especially near the lower extremity of the canal. Sometimes the cavity is partly filled by calculous concretions. The costiveness attending enteritis has also been referred to a lessening of the calibre of the bowels by spasm; but no doubt now exists that it is rather owing to an interruption of the secretions naturally poured into the intestines, and to a diminution in the action of their muscular fibres; for, as Bichat fully ascer-

GEN. VII.
SPEC. I.
Coprostasis
constipata.

Diminished
peristaltic
action.

Feces ac-
cumulated
sometimes
prodigious.

GEN. VII.
SPEC. I.
Coprostasis
constipata.

tained, it is not the character of an inflamed muscle to contract even with its ordinary vigour. Tumours in the neighbouring parts, compressing the intestines, necessarily impede the passage of the contained feces. Hence, in pregnancy, costiveness is a common consequence of the pressure of the enlarged uterus on the great intestines; and a steatomatous tumour in the omentum has been known to produce the same effect.]

Why not
always fol-
lowed by
colic.

Intestinal
strictures
more fre-
quent in the
large intes-
tines.

Examples
of the dis-
ease from
this cause.

A stricture in any part of the intestinal canal, from whatever cause, has a tendency to produce an accumulation of feces, in the same manner as it produces one species of colic. But colic does not always follow; for the bowels are occasionally less irritable than usual, and the stomach continues sound. Strictures in the colon have sometimes existed without being suspected. Dr. Baillie has given a striking example in a case related to him by Sir Everard Home, but a still more striking one from his own practice.* In the last, the patient, a shoemaker, aged thirty, subject to habitual costiveness, became at length much more so; and, from having motions three or four times a week, passed them not oftener than once or twice in a week or a fortnight, and this, moreover, with considerable pain in the lower part of the belly; and at length was incapable of passing a motion by any means. The real cause of the disease not being very clearly suspected, the strongest purgatives were given to him, both by the mouth, and in the form of clysters, as five grains of calomel and ten of gamboge; ten grains of calomel and thirty of jalap; and at one time four grains of elaterium, which made him sick, but produced no other effect. Two drachms of gamboge were given in the form of an injection, and afterwards tobacco-smoke, but altogether in vain; as were also draughts of crude quicksilver by the mouth, shocks of electricity through the abdomen, and the affusion of cold water on the feet. His appetite was but little interfered with, and he passed water freely. A scoop was introduced into the rectum, but this gut was found empty. Under this state of things the belly swelled gradually, and at length arrived at an enormous size, and the patient died in the fifteenth week from the last evacuation. An examination after death showed the real nature of the cause; for at the lower end of the sigmoid flexure of the colon there was a narrow stricture, which would hardly admit the passage of a goose-quill, accompanied with an ulcer, which was partly in the situation of the stricture, and partly in the gut above it. This intestine was peculiarly loaded with feces, and enormously distended; the mean of the transverse diameter being above six inches. All the large intestines, where the distention was considerable, had their muscular coat a good deal strengthened, and the longitudinal bands had become twice as broad and thick as in their natural state; the system thus wonderfully accommodating itself, for many weeks, to circumstances which seemed incompatible with the continuance of life. [This case demon-

* Trans. of a Society, for Med. and Chir. Improvement. See also a case, very similar in every particular, reported by Mr. Sterry, in the Med. Repository for May 1823.

strates the value of the advice given by Willan respecting the use of a long bougie, as mentioned in the observations on colica constricta.]

GEN. VII.
SPEC. I.
Coprostasis
constipata.
Effects of
constipation.

The effects of constipation, when long continued, are, pains in the head, nausea and sickness at the stomach, febrile irritation, general uneasiness in the abdominal region, congestion in the abdominal organs; and hence an impeded circulation of the blood, piles, varices in the lower limbs, and, as we have already seen, colic. [Many hysterical affections, chlorosis, and chorea, or St. Vitus's dance, formerly supposed to be unconnected with the state of the bowels, are now proved* to be very prejudicially influenced, if not excited, by constipation. Even symptoms, bad enough to cause the case to be set down as phthisis, and the patient to be sent to Madeira, were ascertained by Dr. Borthwick to arise from habitual costiveness, and to yield to purgatives.†]

The best aperients in the present species of costiveness are those which quicken the descent of the feces with as little increased action as possible; as diluent drinks sweetened with manna, sugar, or honey; the expressed oils of mild vegetables, as the pistachio, olive and almond; the oleaginous farina of the cocoa nut in the common form of chocolate; figs, tamarinds, the pulp of cassia alone, or in the compound of lenitive electuary; neutral salts. Dr. Arbuthnot advised the use of butter, marrow, and fat. Dr. Cullen found four ounces of fresh butter, taken in the morning, produce a stool or two more than usual in the day. Nauseating doses of calomel and ipecacuan, or of calomel and antimonial powder, will also frequently be of use; and the patient should habituate himself to evacuating the bowels at a certain hour of the day, and should even accustom himself to an effort to this effect, though he may not always be successful. And where this milder process fails, the more powerful purgatives must be had recourse to.

Medical
treatment.

In some instances of very great difficulty, and of an anomalous kind, an affusion of cold water has been accompanied with great success after all common cathartics, quicksilver in its metallic state, antimonials of various kinds, and injections of every sort, have been tried in vain. Two striking examples of this occur in a letter from Dr. Spence of Guildford to Dr. Reynolds, published in the Med. Trans. of the College.

Affusion of
cold water
sometimes
highly be-
neficial.

[By Dr. Daniel, charcoal was found an efficacious remedy. The dose was from one to three table-spoonfuls, given in lime-water, or milk, every half-hour or hour.‡ According to another physician of high reputation, no medicine is better for the relief of obstinate constipation than spirit of turpentine, in the dose of half an ounce, mixed with an equal quantity of oleum ricini.§]

Charcoal.

Turpentine.

Instead of adopting the latter plans, the generality of modern

* See Hamilton on Purgative Medicines. † Edin. Med. Journal, No. 82, p. 69. ‡ Philadelphia Journal, No. 9, p. 119. § Magee, in Edin. Med. Journal, No. 85, p. 307.

GEN. VII.

SPEC. I.

Coprostasis
constipata.Oil of
croton.

practitioners would administer the oil of croton, a very minute dose of which has great power in relieving obstinate constipation, when other cathartics, even in large and repeated doses, have no effect. Mr. Iliff has reported fourteen cases, in which its usefulness was most decidedly proved.* The average dose for an adult is one, or, at the utmost, two drops; and, perhaps, as Mr. Brande observes, the best, or at least the most active form for its exhibition, is that of a pill made up with crumb of bread. It may also be rubbed down with mucilage, and mixed with half an ounce of any aromatic water.† However, according to Mr. Pope, the best mode of administering the oil is to dissolve it first in a little alcohol, in the proportion of about one drop to half a drachm, in which state it may be more easily diffused in some simple fluid; and, by acting on an extensive surface, the purgative effect, he says, is more speedily ensured. The alcoholic tincture, recommended by this gentleman, has been given very successfully to children.‡ In numerous instances of difficult deglutition, the simple application of the oil to the tongue has answered the purpose. When the stomach is so irritable as not to bear ordinary cathartic medicines, the oil of croton is also a valuable remedy. It has sometimes been given in clysters, in which form the dose may be five or six drops. In one very obstinate case, suspected to depend upon intromsception, Dr. Chisholm employed with success a strong solution of common yellow soap, of which more than a large wash-hand bason was gradually, but perseveringly, thrown into the large intestines with Read's syringe.§]

Injection of
a solution
of soap.SPECIES II. Coprostasis Obstipata.—*Obstipation.*

The Feces, when discharged, hard, slender, and often scybalous; the temperament weakly, or the habit sedentary.

How pro-
duced.

THIS is in most cases the result of a sluggishness of the peristaltic motion in persons of infirm or delicate health: in consequence of which the refuse matter of the aliment, usually small in quantity, is a long time passing through the intestinal tube, and hence becomes indurated, shrunk, and shrivelled, so to speak, by the length of time it is exposed to the power of the intestinal absorbents, notwithstanding they may have no such increased action as occurs in the preceding species. This form of costiveness is most frequent in persons of advanced life; in whom the feces, minute in quantity and deprived of moisture, are sometimes discharged in the form of a scroll, and sometimes in small lumps, of the shape of buttons or balls, as I have already observed when treating of *colica constipata*; which affection also, as there remarked, is often produced by the irritation that these retarded materials at length excite. So feeble, indeed, is the expulsive power of the intestines in many cases of

Most fre-
quent in ad-
vanced life.

* Lond. Med. Repository, No. 97.

† Manual of Pharmacy, p. 183.

‡ See Med. Chir. Trans. vol. xiii. p. 99.

§ Med. Repository.

old age, that it is sometimes necessary, as recommended by Dr. Warren, to introduce a sort of marrow-spoon up the rectum, for the purpose of bringing away the dry masses that have lodged there. GEN. VII. SPEC. II. Coprostasis obstipata.

[When a large accumulation of feces takes place in the rectum or colon, it becomes itself the cause of a most distressing constipation, attended with peculiar symptoms, and sometimes terminating fatally. The disorder was first described by an anonymous writer,* and additional cases of it have been subsequently reported.† As Dr. Bateman observes, it is the more important to attend to this complaint, because it assumes the appearance of a diarrhœa, or rather a chronic dysentery, and has often been erroneously treated with astringents and opiates. The patient complains of severe pain about the lower region of the belly, remitting and again returning after frequent but short intervals, and accompanied with a bearing down, and almost continual inclination to go to stool. Only a small quantity, however, of thin discharge, perhaps mixed with little hard knobs of excrement, is discharged, after which the pain abates. When from a previous costiveness, and the above mentioned symptoms, the loaded state of the rectum is to be suspected, this bowel should be examined *per anum*, and the feces broken down and extracted with some convenient instrument. The accumulation that takes place is sometimes very great. This case is frequent in persons of advanced age, and more frequent in the female, than the male sex. Whatever tends to lessen the peristaltic motion of the bowels must induce a predisposition to it; and it has been often occasioned by the long-continued use of bark, opium, and other astringent medicines.‡]

From accumulation of the excrement in great intestines.

It sometimes happens, however, that a contrary temperament prevails in old age; that the bowels are irritable and the motions loose. Celsus has laid it down as a maxim, that when the bowels are loose in youth, they commonly become confined in advanced life, and that if confined in youth, in advanced life they are often laxative. Quibus juvenibus fluxit alvus, plerumque in senectute contrahitur; quibus in adolescentia fuit adstricta, sæpe in senectute solvitur.§ I cannot say, that I have been able to confirm this position by my own observation or experience.

Sometimes a contrary habit in advanced life. Remark of Celsus upon this discrepancy.

In costiveness from this cause, our aperients must be derived from other materials, than those recommended under the last species; for here we have far less reason to be afraid of the warmer and aromatic purgatives. And hence, while we allow a freer use of wine, we may successfully have recourse to aloes, the compound pill of this name, and the balsam of copaiba.

Remedial treatment.

The analeptic pill of Dr. James, which combines a preparation of antimony with resinous purgatives, is often a very serviceable medicine: as is also the form recommended by Dr.

* Med. Obs. and Inq. vol. iv. p. 123. † Duncan's Med. Comment. vol. x. p. 255; vol. xii. p. 282. ‡ Bateman, in Rees's Cyclopædia, art. CONSTIPATION § Medecin. lib. i. c. 3.

Parr, which consists of half a drachm of the gum pill, the same quantity of the pilula aloes cum myrrhæ, with ten grains of antimonial powder, made into fifteen pills.

GENUS VIII. DIARRHŒA.—LAX. LOOSENESS.

The alvine evacuations crude, loose, and too frequent ; with little or no griping or tenesmus.

Chief
proximate
cause.

OF all the specific forms of this disease, the chief proximate cause, as it is called, or the symptom that gives rise to all the other symptoms, is an increased peristaltic action throughout the whole or a great part of the intestinal canal : and as this may be produced by various means and under different circumstances, it must often stamp a peculiarity in the character of the disorder, and lay a foundation for numerous species.

[Perhaps, instead of employing the preceding language, and representing increased peristaltic action as the proximate cause, it would be more correct to say, that the essential part of this disease consists in a preternatural augmentation of the peristaltic motion and of the intestinal secretions ; the predisposing causes being a peculiar irritability of the intestines and of their secerning vessels. To call increased peristaltic action the proximate cause, seems to the editor to be inaccurate, since this exists in several other cases never comprehended under the name of diarrhœa.]

Peristaltic
action how
increased.

The peristaltic action of the intestines may be increased, and consequently looseness or diarrhœa occasioned, firstly, by irritating materials thrown into them by the mouth ; secondly, by a morbid change in the fluids which are naturally secreted into the intestinal canal ; and thirdly, by an irritable state of the intestines themselves, or the membrane that lines their inner surface. Independently of which, the same effect may follow, in a variety of ways, from the readiness with which the intestines associate in the action of remote organs. Thus sudden passion or commotion of mind will frequently excite looseness ; sudden cold or heat applied to the surface of the skin will do the same. [And, among the diseases of other parts of the body, which affect the intestines, the irritation of dentition in infants may be mentioned as a familiar illustration ; as it is seldom difficult, without producing diarrhœa. The sympathy, between the skin and the bowels, is particularly great in many individuals, so that exposure to damp or cold air, or getting wet in the feet, will generally bring on a looseness. Diarrhœa is also a frequent and a most dangerous assailant in the advanced stage of a great variety of diseases, as fevers, phthisis, chronic hepatitis, lumbar abscesses, diseased joints, &c. ; completing that prostration of strength usually seen a little before their fatal termination.] But as all affections of this last kind are evidently cases of mere sympathy, they must be excluded from the history of diarrhœa considered as an idiopathic disease ; and even in their treatment can only be remedied by remedying the primary complaint.

Often occurs
from sympathy
with
other
organs.

The subdivisions of diarrhœa may be resolved into the seven following :

GEN. VIII.
SPEC. I.
Diarrhœa.

| | |
|---------------------|---------------------|
| 1. DIARRHŒA FUSA. | FECULENT LOOSENESS. |
| 2. ————— BILIOSA. | BILIOUS LOOSENESS. |
| 3. ————— MUCOSA. | MUCOUS LOOSENESS. |
| 4. ————— ALBA. | WHITE LOOSENESS. |
| 5. ————— LIENTERIA. | LIENTERY. |
| 6. ————— SEROSA. | SEROUS LOOSENESS. |
| 7. ————— TUBULARIS. | TUBULAR LOOSENESS. |

SPECIES I. Diarrhœa Fusa.—*Feculent Looseness.*

The feces of common quality, but immoderately loose and copious.

This species generally works its own cure without the aid of medicine: for its common causes are food eaten to excess, or intermixed with an undue proportion of irritating materials, saline, saccharine, or vinous: in consequence of which they pass rapidly, and not thoroughly digested, from the stomach, and urge the intestines to an undue degree of activity. Hence often, antecedently to the looseness, there is a sense of sickness, and perhaps a few slight torminal pains. But if the disorder do not prove its own remedy, it is easily removed by any common purgative. In weakly stomachs, or where the intestines are sluggish, this mode of diarrhœa is also occasionally produced by a retardation of the aliment, till it irritates from acescency, putrescency, or superabundant accumulation; and where it is not checked in due time, it will occasionally, like several of its cognate species, run into a chronic form, and prove extremely troublesome and obstinate. In some cases, it has lasted for two* and even for three years,† and it then requires to be restrained with caution; for a sudden transfer to a state of costiveness has often produced some severe complaint; and in one or two instances epilepsy‡ and phthisis.§ And the same remark may be applied to the diarrhœa that occurs during dentition, which ordinarily keeps off febrile irritation; and, when violent, should be moderated, but not subdued.

Common causes.

For the most part easily cured, and often cures itself.

Sometimes chronic and obstinate; and then requires a cautious treatment.

This species is also produced occasionally by sudden exposure to cold, and especially by cold bathing; by great agitation of mind, and particularly that of fright, or anger, sometimes even when those passions have merely existed in dreaming;|| and occasionally also by the bare sight of a purgative or other medicine which the patient is reluctant to swallow. All these are instances of sympathetic action, which has sometimes shown itself in perhaps a still more extraordinary way, where there has been a peculiar irritability of habit. Thus Borrichius relates a case, in which it was produced by introducing a globule of black hellebore into an issue in the arm.¶ [In certain individuals this

Examples of sympathetic action.

* Riedlin, Cent. III. Obs. 90. † Forestus, Lib. xxii. Obs. 3.

‡ Ephem. Nat. Cur. Dec. i. Ann. i. Obs. 85. § Id. Ann. x. Obs. 68.

|| Id. Ann. iii. Obs. 234. ¶ De Qualitat. Occultis, Dissert. et Orat. Acad. Hafn. 1715.

GEN. VIII.

SPEC. I.

Diarrhœa
fusa.

idiosyncrasy is so strong, that particular articles of food, quite inoffensive to the generality of people, will invariably bring on diarrhœa. The complaint is frequently produced by a sudden change of diet, as from an animal to a vegetable one; or by a change of the water, or bread, to which we have been accustomed. In this species of diarrhœa, as indigestion and crudities in the stomach are frequently the cause of the complaint, emetics have often been found serviceable. But purging has been supposed to be still more necessary to remove the crudities that have passed into the bowels. The celebrated Cullen believed, however, that this practice is founded upon very erroneous notions. It rests upon the supposition of an acrimony present in the intestines, that ought to be carried out by purging. But from whatever source the acrimony proceeds which can excite a diarrhœa, it may be considered, he says, sufficient to evacuate itself, so far as that can be done by purging. Dr. Bateman pronounces this opinion extremely rational, and observes that, when merely opposed to the indiscriminate use of purgatives in diarrhœa, its justness is undeniable. But he believed, that Dr. Cullen, in avoiding one extreme, gave a sanction to another. In a recent case of idiopathic diarrhœa from excesses at table, or cold, a gentle purgative is seldom, if ever, in the slightest degree hurtful. However plausible the supposition, that the irritating matter in the bowels will invariably purge itself off, experience proves that it is frequently very imperfectly voided, and that a part of it remains behind, keeping up a degree of irritation, often continuing the disease, and even converting it into dysentery. Whenever any material degree of tenesmus is observed, a purgative is generally indicated; and, if the bowels be very irritable, opium may be combined with it.* In these cases, calomel and ipecacuanha, calomel and rhubarb, or rhubarb with the tinctura, or confectio opii, are invaluable medicines. When the case resists these medicines, small doses of the chalk mixture, with the tinct. catechu, the compound powder of kino, and tinct. opii, may be exhibited; and in very long protracted, unyielding examples, the camphor mixture with nitrous acid and opium,† or the sulphate of copper joined with opium, may be given twice a day, in the dose of half a grain, gradually increased to that of a grain and a half, as recommended by Dr. Elliotson.‡ In every form of diarrhœa, the diet is a most important consideration: it should consist of milk, rice, arrow-root, tapioca, sago, jelly, beef-tea, or broth. In particular, all malt-liquor should be avoided, and very weak brandy and water, wine and water, or barley-water, preferred as drink.]

* Bateman, art. DIARRHŒA, in Rees's Cyclopædia.

† R. Acidi Nitrosi ℥j, Misturæ Camph. ℥ viij, Tinct. Opii gr. xl. Cochl. magn. iv. quarta quaque horæ sumend. Recommended by Mr. Hope in Edin. Med. Journ. No. 88.

‡ See Med. Chir. Trans. vol. xiii.

SPECIES II. Diarrhœa Biliosa.—*Bilious Looseness.*

The feces loose, copious, and of a bright yellow.

FROM the highly bilious tincture of the dejections, there can be no doubt that the bile, in this species, is secreted in a greater quantity than usual, and perhaps with an unusual degree of pungency; and hence the excess of peristaltic activity. GEN. VIII.
SPEC. II.

The most common remote cause of this species of diarrhœa is a great and sudden increase in the temperature of the atmosphere, or a less than its mean degree of heat, operating for some weeks or months. Dr. Lind has justly remarked, that a rapid change of climate, whether from a colder to a hotter, or from a hotter to a colder state, is equally apt to excite diarrhœa. Common
remote
causes.

But the complaints hereby produced are of very different characters. That occasioned by sudden cold consists of an acrid mucous discharge, and will be treated of and explained under the next division. The diarrhœa, excited by passing rapidly from a cold into a hot climate, belongs to the division before us, and depends upon an increased secretion of bile of bad quality. Differ in the
symptoms
they pro-
duce.

The calorific rays of the sun exercise a peculiar influence upon the organ of the liver, and soon stimulate it to an augmented action. In the intertropical regions, the quantity of bile hereby secreted is even more than the bile ducts can conveniently carry off; whence some portion of it retrogrades, and is carried by absorption into the system, and is one of the causes, though not the only cause, of the darker hue of the skin in those quarters. In our own country, this species of diarrhœa is therefore found most commonly in the earlier part of the summer, when suddenly and vehemently bursting upon a cold spring; or in the autumn, when the liver has for many weeks been exposed to the effects of a very vigorous sun, and the whole system has become relaxed and debilitated. If at this time the atmosphere be pure, the disease is simple, and may be subdued without much difficulty; but if the rays of the sun should carry off the greater part, but not the whole, of the stagnant water from the fens and marshes of a country, and convert them into corrupt and offensive swamps, the atmosphere will be loaded with an effluvium of decomposed organized matter, animal or vegetable, or both, and the simple bilious diarrhœa will be converted into a remittent bilious fever; and hence, in few words, the common origin of the bilious autumnal fevers that so frequently prevail at the close of the summer season. Liver, how
affected by
summer
heat.

Where the bilious diarrhœa is simple and unconnected with fever, it is seldom a formidable disease; a few doses of calomel, with a view of emulging the bilious pores of the liver, correcting the irritation of the organ, and taking off its increased action, with the assistance of mild diluents and demulcents, as infusions of linseed, quince seeds, or comfrey roots, for lubricating the intestinal canal which has participated in the irritation, will usually prove a successful practice. The last was at one time a popular medicine in diarrhœas, and Dr. Cullen ob- Sometimes
converted
into a bi-
lious remit-
tent fever.
Medical
treatment.

jects to its being omitted in the *Materia Medica* of the Colleges. If the flux, and consequently the excitement of the liver, should still continue, opiates may be employed with advantage.

SPECIES III. Diarrhœa Mucosa.—*Mucous Looseness.*

The dejections consisting of, or containing, a copious discharge of Mucus.

GEN. VIII. THIS species bears a striking resemblance to the defluxion
SPEC. III. from the nostrils in catarrh. Its common cause is cold, particu-
Causes. larly in the feet; the motions are acrid, often with but little
biliary tinge: and, like the nostrils in a catarrh, the lower part
of the rectum is excoriated. It is hence denominated by many
writers *catarrhus intestinorum*, and by Dr. Boerhaave *diarrhœa*
catarrhalis.

Why called
catarrhus
intestino-
rum, or
diarrhœa
catarrhalis.

Purging
injurious.
Copious
diluent.

The disease is, perhaps, also sometimes produced by acrid
ingesta, as a coryza is occasionally excited by sternutatories in
those not accustomed to them. Here the process of purging will
rather add to the complaint than diminish it; and copious di-
luents and demulcents afford the most rational mode of treat-
ment: with which plan the daily diet should be made to co-
incide.

Often occa-
sioned by a
rapid change
of tempera-
ture in tra-
velling, or
voyaging.
Illustrated.

This species of mucous or catarrhal diarrhœa, like the two
preceding, is also frequently produced by any sudden change in
the temperature of the atmosphere from great heat to great
chillness; and hence its frequency and severity in passing rap-
idly from a warmer to a colder climate, as into the North Seas
in the summer time. "In the outward bound passage of the
vessels employed in the whale fishery on the coast of Spitzber-
gen," says Mr. Macartney Ross, "I have more than once had
occasion to remark the very great effect of a transition into a
cold latitude in deranging the state of the alvine discharge. The
vessels, destined for this often perilous voyage, generally leave
England about the end of March, when the weather is compa-
ratively temperate. A week or two serves to convey them
within the Arctic Circle, in the course of which time few cases
are beginning to appear. But after being fairly within the
limits of the Frozen Sea, and encompassed with ice, so that
the wind even carries with it a strong and penetrating frost, the
cases daily increase both in number and severity. The weather
becoming progressively milder after the beginning of May, and
the seamen by this time being more inured to the climate, few
or no cases are met with; and such as do occur I have always
found to arise from the patient having been called suddenly from
bed in the course of duty, and exposed to an intensely freezing
atmosphere."

In this case
how to be
remedied.

Where the looseness, of whatever species, is produced by a
sudden chill on the surface, small doses of ipecacuan, with or
without opium, have generally been given with advantage.*

* Toxe, Bibl. i. p. 113.

Fernelhuys* and Dr. Fothergill† recommend it alone: Dr. Stoerck,‡ with more reason, in combination. And if the disease should become chronic, the warmer bitters and astringents should be had recourse to, as columbo,—to which also Dr. Stoerck recommends an addition of laudanum,§—cusparia, and arnica (*doronicum Pardalianches*, Linn.), which, though rejected in our own country, maintains its reputation all over the continent. Of the arnica-root, Dr. Stoll used to give a drachm every two hours.||

GEN. VIII.
SPEC. III.
Diarrhœa
mucosa.

SPECIES IV. Diarrhœa Alba.—White Looseness.

The dejections milky, or resembling in their appearance a mixture of water and lime, with a frothy scum.

[In the preceding editions of this work, the learned author described two species under the names of diarrhœa chylosa and diarrhœa gypsata. The first is the case denominated in Cullen's Nosology "diarrhœa cœliaca, quâ tumor lacteus, specie chyli dejicitur." The appellation of chylous looseness, had it been merely used as a simile, would have been but of little consequence; but, promulgated as it has been by various experienced physicians, and even by Dr. Good himself, as derived from the really chylous nature of the excrement, it becomes a vehicle of error, and the judgment of the practitioner in the sick-room is too apt to be blinded by it.]

No such
disease as
diarrhœa
chylosa.

The colour of the stools, according to Dr. Good, affords evident proof, firstly, that the bile, which gives the usual tinge to the feces, is either not secreted, or impeded in its flow into the intestines; and secondly, that the food, after being converted into chyle, is not absorbed and carried into the system.

View of
proximate
causes,

The non-absorption of the chyle must proceed from some mischief in the lacteals or mesenteric glands; which may either labour under such an inertness or torpidity as to render them incapable of carrying on their proper function, or may be so obstructed in their course as to be prevented from exercising their function, notwithstanding their being in a state of health.

and remote
causes,
adopted by
the author.

[Dr. Rummel¶ has taken an excellent survey of the various descriptions of this supposed disease given by authors, and ably exposes the mistake they all committed in believing, that there was such a disease as diarrhœa chylosa, the existence of which he completely disproves. It is to Dr. Graves, of Dublin, however, that the profession in this country is under particular obligations, for his judicious notice of the erroneous doctrines, broached concerning the white forms of diarrhœa.** A gentleman applied to him, after having suffered a good deal from an epidemic dysentery. The febrile symptoms, and discharge of blood, had ceased for many weeks; but the emaciation and weak-

Symptoms
of one form
of diarrhœa
alba.

* An omni alvi fluxui radix Brasiliensis? Paris, 1706. † Med. Observ. and Inquir. vol. vi. art. 18. ‡ Klinische und Anatomische Bemerkungen, p. 7. § Ibid. || Mat. Med. Part ii. p. 307. Part iii. p. 163.

¶ Hufeland's Journal, June 1825.

** See Dublin Hospital Reports, vol. iv. p. 46, &c.

GEN. VIII.
SPEC. IV.
Diarrhœa
alba.

Secretion
from the
mucous coat
of the in-
testines in
a morbid
state.

The reality
of gypseous
diarrhœa
unproved.

Causes of
the white
appearance
of the
motions.

Secretion
from the
mucous
coat of small
intestines
also liable
to changes.

ness continued to increase. He had one or two natural stools daily, without tenesmus; but, in the course of every twenty-four hours, he experienced eight or ten sudden calls to stool, attended with an impossibility of resisting the bearing down and weight felt in the rectum. Each evacuation consisted merely of two or three table-spoonfuls of muco-gelatinous matter, which varied in colour and consistence, but generally resembled thick milk, or a puriform fluid, and occasionally a transparent jelly. This fluid was evidently a secretion from the mucous membrane of the rectum in a state of irritation, or chronic inflammation. It is observed by Dr. Graves, that such a condition of a mucous membrane constitutes the disease denominated chronic blennorrhœa; and, when it occurs in the rectum, produces a disease, which, on account of the white colour of the discharge, would formerly have been called fluxus cœliacus, and the evacuation attributed to the loss of chyle by stool; for the chyle was supposed to be formed, but not absorbed, or carried into the system. As Dr. Graves very properly remarks, it is even less surprising, that Dr. Good should have retained the old species, diarrhœa chylosa, than that he should have inserted a new one, whose existence rests upon still more doubtful evidence. This new species he named diarrhœa gypsata, in consequence of the evacuations resembling in their appearance a mixture of water and lime, which appearance he actually fancied to depend upon the presence of earthy particles in the fluid discharged. This view of the subject he also fortified by several ingenious, but premature, reflections on the power of animals to secrete lime, and especially on the presence of lime in the intestinal calculi.

Unfortunately, the main and essential proof of the existence of lime in the motions was wanting, all chemical analysis of them having been neglected. Dr. Graves has often seen stools of the colour here described, and so has the editor of this work, which colour was referrible to the absence of bile, and a morbid secretion of white viscid mucus from the intestines. Viscid and whitish discharges from the mucous membranes lining the eyelids, bronchial tubes, urethra, vagina, &c. are, as Dr. Graves observes, extremely common, and depend on a state of irritation similar to that which produces the white and scanty alvine evacuations arising from the mucous membrane of the rectum. It is evident, says he, from the case I have related, that chronic irritation of this part may produce much constitutional disease. When, however, the affection extends beyond the rectum, to the other portions of the large intestines, it occasions symptoms still more urgent. That a similar state of the mucous membrane lining the small intestines may occur, and give rise to a white secretion from its surface, is proved by examination of their contents in persons who die of the East Indian cholera, in many of whom white milk-like stools are observed during life. On dissection, these stools are found to depend on a secretion from the small intestines. The diarrhœa alba, described by Hillary as occasionally epidemic in Barbadoes, probably arises from a similar cause. This latter name, as conveying no erroneous hypothesis, the ed-

itor ventures to recommend for all the cases comprised under the heads of diarrhœa chylosa and diarrhœa gypsata in the former editions of this work. It is a name that simply expresses the fact of the white colour of the motion, without involving the reader in any hypothesis, respecting chyle or lime being parts of what is voided.

For a description of the disease to which the objectionable epithet gypsata was applied, Dr. Good says :]

I am chiefly indebted to a valuable paper of Dr. Baillie, communicated to the London College, and published in its Transactions.* “The evacuation,” says he, “consists of a matter resembling in its appearance a mixture of water and lime, which is generally very frothy on its surface. When the disease is violent, the discharges are copious and very numerous, of a pale colour and sour smell, and the froth looks like yest. When it changes to a milder form, the evacuations are still more or less pale, but of the consistence of pudding, and do not occur oftener than two or three times in twenty-four hours. The appetite is often good, but sometimes defective. The countenance thin and sallow, but not much emaciated. The pulse varies but little from the standard of health, but is rather disposed to acceleration. The tongue is generally covered with a white fur of moderate thickness: the urine of a somewhat deeper hue than natural, generally clear, occasionally turbid. An examination of the abdomen discovers nothing unnatural. The bowels are apt to be distended with wind, but there is no tumour, nor sense of pain upon pressure.”

GEN. VIII.
SPEC. IV.
Diarrhœa
alba.

One variety
described
by Dr.
Baillie.

The disease occurs most commonly in persons who have resided for a considerable time in a warm climate, or who have suffered from affections of the liver: but it is sometimes met with in persons who have never left England, or been conscious of any hepatic complaint. It takes place more commonly in men than in women, though chiefly so, perhaps, because men endure the evils of hot climates more frequently than women.

Sometimes there will be a state of amendment indicating a cure. The motions become figured, and of a darker hue, but rarely of the deep colour of health. This improvement, however, is mostly of only a short duration, and the patient soon relapses into the habit of frothy dejections. Those who are afflicted often live for several years, but the disease continues with the changes just noticed, and they hardly ever fully recover. The mind, as in other diseases of irritable temperaments, seems to exercise some influence; for the symptoms are aggravated, or the exacerbations appear more frequently, under the embarrassments of business, or the agitations of anxiety. Repeated returns of the complaint at length wear out the constitution, and the patient sinks from corporeal exhaustion.

In the case formerly termed diarrhœa chylosa, and supposed to depend sometimes upon obstruction of the lacteals and mesenteric glands, and sometimes upon a scanty supply of bile, Dr.

Constitu-
tions chiefly
attacked
by it.

Process
slow, and
improve-
ment often
deceitful.

Affected by
the state of
the mind.

Medical
treatment.

* Vol. v. art. xii.

GEN. VIII.
SPEC. IV.
Diarrhœa
alba.

Good recommended the following practice: In the first case, he says, the object is to remove the obstruction, which may be best accomplished by active stimulants, as calomel. In the second, if calomel be given at all, it should be in very small doses; but the common preparations of zinc and iron offer a better chance of success: and the *rheum rhabdanticum*, or English rhubarb, being very slightly aperient, and far more astringent than the *rheum palmatum*, a useful medicine in various kinds of looseness from relaxation, may here also be employed to advantage, in doses of a scruple taken twice a-day; and, where a more powerful vegetable astringent is required, we may find it in the leaves and young twigs of the *rhus coriaria*, or common sumach; which, however, are chiefly cultivated in our own country for dyers and tanners. The berries possess a like property, and are acid, austere, and cooling. To these medicines may be added blisters, or rubefacients to the abdomen.

[The editor of this work is not inclined to place much reliance on any part of the above practice, except the calomel and blisters. As the disease seems to be connected with a scanty secretion of bile, and a morbid state of the secreting vessels of the mucous coat of the intestines, small doses of calomel, or the blue pill, joined with opium, counter-irritation of the skin of the abdomen, and anodyne or astringent injections, seem to him the most advisable remedies at first; and they may be followed by tonics, and other alteratives, according to circumstances. In particular, the nitrous æther, and tinct. opii, which have been frequently exhibited in the camphor mixture, in many inveterate cases of diarrhœa, with superior effect, should be recollected.]

In the examples, characterized by the resemblance of the stools to a mixture of lime and water, Dr. Baillie estimates the influence of medicine as very inconsiderable. Half a grain of calomel, three grains of pilulæ hydrargyri, or a few of the hydrargyrum cum cretâ, taken every night, or every second night, have occasionally produced some advantage, by stimulating the liver to a better and more plentiful secretion of bile, without impairing the strength of the constitution; and bitters, as cascarrilla or cusparia, combined with a few drops of laudanum, have also occasionally had their use. But, according to Dr. Baillie, the benefit is often only temporary. [Since the period, however, when this eminent physician wrote his observations, experience has pronounced the sulphate of copper to be a valuable medicine for the relief of this and other forms of obstinate chronic diarrhœa. Dr. Elliotson prescribes, at first, half a grain of it twice a day, joined with one grain of opium. The dose is afterwards gradually increased to one grain and a half, or two grains; and the diet consists of milk, arrow-root, beef-tea, and a little wine.*

On the authority of Dr. Rummel, who had employed the extract of nux vomica, Dr. Graves resolved to try the effect of strychnine in cases of diarrhœa alba. One-twelfth of a grain was given, in the form of a pill, twice a day, and with a successful

* See Med. Chir. Trans. vol. xiii. p. 451, &c.

result. Dr. Rummel observes, that, after endeavouring to remove the original cause of the disease, the best remedies are narcotics, combined with strengthening and astringent medicines. *Nux vomica*, he says, possesses a peculiar power in controlling blennorrhœa of the rectum. In the cases recorded by Dr. Rummel, he employed sulphate of iron and columbo, besides sulphur, which has a particular action on mucous surfaces. The cure was generally promoted with *hyosciamus*, or opium, joined with *nux vomica*.*

GEN. VIII.
SPEC. IV.
Diarrhœa
alba.

SPECIES V. Diarrhœa Lienteria.—*Lientery*.

The dejections consisting of the aliment passed rapidly, and with little change.

THE signs entering into the definition of this species prove sufficiently, in the first place, that the stomach is in a morbid state, and that the gastric juice is not secreted in a proper quantity or with proper qualities; and next, that the bile is either not duly secreted, or else obstructed in its passage; for were there a free flux of it, the feces, however crude, would display their common yellow hue, which they rarely exhibit. [According to other writers, however, *lienteric diarrhœa* depends upon a morbid irritability of the stomach and bowels,† whence the food is prematurely expelled from the former organ into the intestinal canal, in an imperfectly digested state; and the bowels themselves, being also morbidly sensible, very quickly void whatever they receive. The motions are at the same time loose and liquid, the exhalant vessels and excretories of the mucous glands pouring out an abundant quantity of their respective fluids. The disease is generally accompanied with great weakness of the digestive power, as well as morbid irritability of the stomach.] *Lientery* (λειεντερία,) *lubricitas intestinorum*, was the name given to this disease by the Greeks, and it is here retained. The Latins, with a loose translation of the term, called it *levitas intestinorum*; and the general idea expressed by both is, that the aliment passes lightly or fleetly along, and with little elaboration by the intestines; whose peristaltic action is at the same time quickened.

Proximate
cause.

Specific
name,
whence
derived.

[The view taken by Dr. Good, of the causes of the present disorder, led him to recommend the general plan prescribed for dyspepsia. According to other physicians, however, the indications are, first, to lessen the irritability of the whole alimentary canal, by the exhibition of opium, joined with astringents and absorbents; secondly, to increase the digestive power of the stomach, by the administration of tonic bitter medicines, as the infusion of *cascarilla*, *gentian*, or orange peel, the decoction of *cinchona*, or small doses of the sulphate of quinine. Moderate exercise, especially on horseback, will tend to re-establish the functions of the stomach; and all cold articles of diet, or such as

* Graves, in Dublin Hospital Reports, vol. iv. p. 50.

† Bateman, in Rees's Cyclopædia, art. LIENTERY.

GEN. VIII.
SPEC. V.
Diarrhœa
Lieutéria.

are difficult of digestion, should be avoided ; particularly salads, and other raw vegetables. Dr. Bateman once witnessed a severe attack of lientery, brought on by eating a little ice-cream, when the patient had been previously suffering from indigestion ; the enfeebled digestive powers seemed to sink at once, and the food was discharged almost unchanged. When the alimentary canal is in the above-mentioned irritable state, the invalid should refrain from exercise immediately after meals.]

SPECIES VI. Diarrhœa Serosa.—*Serous Looseness.*

The dejections almost entirely liquid and limpid.

Proximate
cause.

FROM the thin fluidity of the stools in this species, Hoffman has described it by the name of *diarrhœa aquosa*. It is evidently dependent upon a very irritable state of the excretory vessels of the intestines ; and sometimes holds the same relation to the third species, *diarrhœa mucosa*, as the limpid defluxion of an incipient catarrh does to the mucous discharge in which it terminates. Yet the irritation is here much greater than in mucous diarrhœa, often produced by different causes, and frequently requires a different mode of treatment. The mucous diarrhœa, or indeed any of the preceding, may run into it if long continued ; for the common cause of the irritation is debility of the excretories. Here, again, it must be obvious that purging of any kind would be mischievous : and the most effectual plan of success that has occurred in my own practice, has been the use of warm astringents and gentle stimulants or tonics.

Purging
mischievous.
Gentle
stimulants
and tonics
useful.
Simarouba.

The simarouba (*quassia simarouba*) is particularly entitled to our attention, and will indeed be found useful in most of the species of the genus before us ; as will also, in many cases, the lopez-root (*lopezia Mexicana*), which by Gaubius* was preferred to the simarouba, and which seems to operate at least as much by tranquillizing the irregular or spasmodic action of the intestinal canal, as by any astringent power it may possess. The *geum urbanum*, Linn., better known by the officinal name of caryophyllata or herb bennet, was formerly in high repute for all complaints of this kind, and from its astringent and tonic power deserves to be revived. Its taste is aromatic and austere.

Lopez-root.

Caryophyl-
lata.

Pomegra-
nate.

The *punica granatum*, balaustine or pomegranate-tree, is still continued in several pharmacopœias, and employed in practice in this and the preceding species, both in the flower and bark : the latter seems to have been a favourite medicine with Dr. Mead, who prescribed a decoction of it with red roses and cinnamon, in various diarrhœas proceeding from debility. Cullen† and Strandberg‡ think highly of it. It is, indeed, a powerful astringent, and as such is entitled to attention ; but it has a roughness so unpalatable as to disqualify it for general use. Where these cannot be retained on the stomach, alum alone

* Adversar.

† Mat. Med. vol. ii. p. 44.

‡ Tal om de Fel. 31.

may often be had recourse to with advantage; and Dr. Cullen expresses his surprise that it is not employed more frequently or more freely. His dose is four grains at first, and afterwards a scruple several times a day.

GEN. VIII.
SPEC. VI.
Diarrhœa
serosa.

Where the disease is of very long standing, we often gain great benefit by uniting a tonic or astringent with a diaphoretic, thus strengthening the bowels, while we take off irritation by exciting a transfer of action on the skin. Upon this principle Dr. Fordyce proceeded when he prescribed a combination of tormentil and ipecacuan. A like transfer of action has sometimes been attempted by issues, blisters, and setons. Hippocrates, with more reason, employed for the same purpose emetics,* and has been followed by Fontaine and other practitioners; and Malvachini, with the same view, recommended diuretics.† Dr. Lind‡ and Dr. Adair§ have recommended the native carbonate of zinc, or officinal calamine in fine powder.

Tonics or
astringents
with dia-
phoretics.
Transfer of
action.

And eme-
tics.

Calamipe.

In a very obstinate case that fell to my lot a few years ago, in which the patient, a young woman of twenty-four, had, for ten years, never passed fewer than nine or ten watery stools a day, sometimes tinged with blood, and often accompanied with great spasmodic pain, I found the disease yield in a few weeks to camphor mixture and pills of the resinous gums, after that, as I had reason to believe, all the usual routine of astringent earths and salts, astringent purgatives and narcotics, had been tried, and spent their force in vain. It is probable that in some cases of this kind the superacetate of lead, in doses of a grain, combined with three or four drops of laudanum, might prove equally useful. [Here, also, the sulphate of copper in the dose of half a grain, gradually increased to a grain and a half, joined with opium, and given twice a day, merits trial, the experience of Dr. Elliotson being strongly in its favour.¶]

Camphor
and resinous
gums.

Superace-
tate of lead.

This disease is also occasionally produced by drastic purges, as elaterium; and is often critically employed by nature to carry off dropsies and some other remote accumulations of fluids.

SPECIES VII. Diarrhœa Tubularis.—*Tubular Looseness.*

The Dejections consisting more or less of membrane-like tubes, whitish, viscous, and inodorous.

I HAVE never hitherto seen this species arranged, and not often described; but it occurs frequently in practice; and appears to depend upon a peculiar irritability of the villous membrane of the larger intestines, which, in consequence, secrete an effusion of coagulating fibrin, fibrin mixed with albumen, instead of secreting mucus, occasionally accompanied with some degree of chronic inflammation. It has a striking resemblance

Never hith-
erto arrang-
ed or de-
scribed.

* Περί Πλθων, lib. iii. p. 523.

† On Diseases in Hot Climates.

‡ See Med. Chir. Trans. vol. xiii.

§ Utiles Collectiones.

¶ Medical Commentaries, &c.

GEN. VIII.
SPEC. VII.
Diarrhœa
tubularis.
Exudation
like that
discharged
in croup.
Often mis-
taken for an
exfoliation
of mucous
membrane.
How differs.
Illustrated.

to the fibrous exudation thrown forth from the trachea in croup, but is usually discharged in longer, firmer, and more compact tubes. There is commonly a considerable sense of heat and uneasiness in the rectum; and upon evacuations, the sphincter, partaking of the irritability, contracts so forcibly, that the feces are discharged with great pain and of very small calibre.

From the laminated appearance of this effusion, it has generally been mistaken for a separation of the mucous membrane of the intestines; with which it seems to be confounded by Dr. Simson;* but the exudation has no vascular structure, will not bear extension, and loses its form as soon as handled. At the time of writing I have a case of this description under my care, in a lady of delicate habit, twenty-eight years of age, who has been long labouring under a peculiar irritability of the rectum, giving rise to some degree of chronic inflammation, and a forcible contraction of the sphincter on evacuations. She has already discharged this kind of effusion for six weeks, and in tubes so perfect, as at first to have excited no small alarm in the attendants who noticed it. It is now, in some degree, on the decline both in quantity and tenacity.

Other ex-
amples.

M. Bauer, in his letter to M. de Hahn,† gives similar examples; and a like case is described by Spindler, in which the secretion was worked up into a “*materia alba, longa, compacta.*”‡ It has sometimes assumed the exact shape of the intestine, as though it had cast off a tunic.§

Discharge
in most
cases from
the large
intestines.

I have said, that the discharge in this species proceeds chiefly from the large intestines; and I have seen it so often as to have had sufficient opportunity of determining with tolerable accuracy the part of the canal affected. From a valuable article, however, of Dr. Powell’s,|| it appears at times to take place in the narrower portion of the intestinal tube, as high up, indeed, as the duodenum; for we are told, that it was accompanied with acute pain in the epigastric region; that the stomach was highly irritable; and that it was followed by symptoms of jaundice or obstructed bile.

From a small increase in the pulse, and a coating on the tongue, there seems to have been here also a slight degree of inflammatory action, though so inconsiderable that Dr. Powell questions, whether there was any whatever; but adds, which my own experience leads me most fully to confirm, that the disease is certainly not “disposed to assume that peculiar irritative quickness of pulse which marks enteritis.”

That the affection described by Dr. Powell belongs to the present species, will appear evident from his description of the material evacuated, which seemed “to have formed parts of an extensive adventitious membrane of no great tenacity or firmness. “In the first of the cases,” he adds, “which came under my notice, this membrane was passed in perfect tubes, some of them full half-a-yard in length; and certainly sufficient in quan-

* Edin. Med. Essays, vol. v. p. 153.

† De Morb. Intest. Dresd. 1747.

‡ Obs. 45. § Act. Nat. Cur. vol. v. Obs. 126. || Med. Trans. vol. vi. art. vii.

The secre-
tion some-
times very
abundant.

tity to have lined the whole intestinal canal. In others also, the aggregate quantity has been very large, and it has continued to come away for many days, but it has been in thin irregular flakes, of not more than two inches extent, and not, as far as I could discover, of the perfect tubular form." And he afterwards compares the membranous material thus excreted to that "formed in the trachea, under croup; but the symptoms," says he, "are there more violent and destructive from locality of situation."

GEN. VIII.
SPEC. VII.
Diarrhœa
tubularis.

From the acute degree of pain, which the disease thus situated produced, and must necessarily produce, in the smaller intestines, as also from the spasmodic constriction of the bile-ducts, and the common symptoms of jaundice, the passage of gall-stones was at first suspected, till the character of the intestinal discharge spoke for itself.

Has been
mistaken for
chololithus.

From a like effusion of fibrin in the uterus, Blumenbach has shown, that a tunica decidua has been occasionally produced through the excitement of an aphrodisiac passion alone, without copulation or impregnation;* and Morgagni has given examples of so perfect a formation of the same membrane by the irritation that takes place in painful menstruation (*paramenia difficilis*), as to render it difficult to be distinguished from that belonging to an ovum.† So corpora lutea have been formed, and their cicatrices occasionally found, in the ovaries of virgins.

A. like secretion has occurred in the uterus.

The milder preparations of mercury employed as alterants rather than aperients, have frequently proved serviceable; and the balsam of copaiba still more so. The last is indeed generally useful in a chronic inflammation or irritable condition of the secretions of mucous membranes; and in the disease before us, where I have not been able to induce the patient to take it by the mouth, I have recommended it in the form of injections. In one case in which I prescribed it in this form, three drachms, intermixed with three ounces of mucilage of linseed, being thrown up three times a-day, it proved eminently useful.

Medical treatment.
Alterants.
Balsam of
copaiba.

Common emollient injections, moreover, employed in much larger quantities, where the sphincter will allow the pipe to pass up, afford temporary ease: and a diluent and anodyne injection of warm water and laudanum alone, repeated twice a-day, still more benefit. In the mean while, the mercurial preparations just adverted to, and especially the blue pill, or Plummer's, which is still better (the pil. hydrarg. submur. comp. of the London College), should be taken in a dose of four or five grains every night: and, if necessary, the bowels kept open by two drachms of sublimed sulphur daily.

Copious
emollient
injections.

Blue pill, or
Plummer's.

* Comment. Soc. Reg. Scientiæ Götting. vol. ix.

† De Sed. et Caus. Morb. Ep. xlviii. 12.

GENUS IX. CHOLERA.—VOMITING AND PURGING.

Anxiety, gripings, spasms in the legs and arms; with vomiting and purging; or flatulent eructations and dejections.

GEN. IX.
Distinguish-
ed from
diarrhœa
and vomitus.

CHOLERA has, by several late and present writers of distinction, been regarded as a mere species of some other genus, as DIARRHŒA, which is the view taken of it by Dr. Young; or as a mere variety of some particular species, as *vomitus*, which is the place it holds in Dr. Parr's nosology. It is not always, however, accompanied with a diarrhœa; and, even where it is so, the constant tendency it evinces to an extensive chain of spasmodic actions, gives a striking character to the disease, and justifies its being arranged and treated of as a distinct genus. From vomitus, it is still more widely discrepant.

Origin of
the generic
term.

The term CHOLERA is of ancient use, for we trace it in the writings of Hippocrates. Celsus derives it from *χολη* and *ῥεω* literally *bile-flux*, and Trallian from *χολας* and *ῥεω*, literally *intestinal-flux*, as though the matter discharged from the alimentary canal were excerned by the intestines rather than by the liver. It is highly probable, that, in all its species, we shall have to contemplate the liver as morbidly affected from the commencement, and the bile as some way or other damaged in its secretion, yet not always by too rapid and copious a flow, to which the disease has been generally referred. This, indeed, will be found ordinarily to take place in the first of the three following species; but, in the second, it appears to be injured by suppression rather than by excess; and in the third, by a change in its natural qualities, if, indeed, much of the fluid discharged in this species be not, as suspected by Trallian, in some instances, secerned by the excretories of the intestines. Under either derivation, however, the term is not incorrect; for the alimentary canal and the liver uniformly co-operate in the morbid action, and the fluid discharged is the result of such concurrence.

Character-
ized by mor-
bid flux of
bile rather
than uni-
formly by
increased
flux.

Sometimes,
but impro-
perly, called
cholera
morbus.

Some writers formerly, and many in the present day, have expressed this disease by the pleonastic term of *cholera morbus*, pretending that cholera, of itself, imports *anger* as well as the disease before us, and that *morbus* is added to distinguish between the two. I am not aware, that the word cholera has ever been employed in a mental sense by any Greek writer, though several of its co-derivatives have been. It stands alone in Celsus and Galen; and if a distinctive adjunct were not necessary in their days, it must be wholly superfluous in ours. The following are the species that seem clearly to belong to this genus:

1. CHOLERA BILIOSA.
2. ——— FLATULENTA.
3. ——— SPASMODICA.

BILIOUS CHOLERA.
WIND CHOLERA.
SPASMODIC CHOLERA.

SPECIES I. Cholera Biliosa.—*Bilious Cholera.*

The vomiting and purging frequent and copious, with a redundancy of bile.

THIS species is both sporadic and epidemic. Under the first form it is usually of slighter and shorter duration; and its common causes are, superabundant and perhaps acrid bile; suppressed perspiration, particularly by cold or damp applied to the feet, as in standing long on a moist soil in foggy weather; cold drinks, especially when the body is considerably heated by exercise; cold, indigestible fruits, as unripe apples or pears, cucumbers, melons, mushrooms; drastic purges taken in excess; and in one instance an excessive dose of emetic tartar;* a sudden fright, and particularly from thunder;† or any other rapid exhaustion of the sensorial power.

The causes are, therefore, many of them the same as those that produce several of the species of diarrhœa and colic; particularly *colica cibaria*, or surfeit. Sydenham, indeed, observes, that the symptoms of the last and of cholera are alike, and the cure the same; yet adds that the diseases are of a different kind. In effect, the last is peculiarly distinguished by its wandering or universal spasticity; and hence becomes a far more dangerous, because a far more general, affection.

The epidemic form of the disease shows itself commonly at the close of summer, or the beginning of autumn—Sydenham says, as certainly as the appearance of swallows in the spring, or cuckoos about the dog-days; [and that it very seldom continues longer than the month in which it began. But, as Dr. Bateman observes, this observation does not accord with the experience of the present times. Cholera is now seen perhaps more frequently in September than in August; and cases sometimes occur, though it be not epidemic, considerably earlier than August; even in June, or May.‡] One of the immediate effects of the calorific rays of the sun is to stimulate the liver to an excessive secretion of bile; hence the alimentary canal is overloaded with it, and perhaps the blood impregnated. And hence again, the greater violence of this complaint and its accompaniment with peculiar symptoms in hot climates, as we shall have occasion to observe presently. In addition to this cause, however, which operates directly upon the body, there is another which operates indirectly upon the body, and directly upon the atmosphere; and that is the ascent of an unhealthy effluvium from the decomposition of animal and vegetable substances that form the face of swamps, marshes, and other moist grounds; which predispose the body to the action of this and other diseases as well: unless it be conceived, that the particular epidemy results from a particular combination of the decomposing elements, so as to produce a choleric miasm, as, under another combination, they produce a febrile miasm; a subject well worthy of consideration as it relates to the third species of cholera.

GEN. IX.
SPEC. I.

Both sporadic and epidemic. Mildest under the first mode.

Causes.
How far related to colic.

Epidemic form; its chief season.

Why principally in the autumn.

* Henrici Dissert. de Cholera Morbo, Hal. 1740. † Phil. Trans. 1667.
Henric. Diss. supra-cit. ‡ Rees's Cyclopædia, Art. CHOLERA.

GEN. IX.

SPEC. I.

Cholera
biliosa.Whether a
choleric as
well as a
febrile
miasm.
Often
severe.
General
character.Nature
of the
discharge as
described
by Celsus.Medical
treatment.First inten-
tion.Diluents
and demul-
cents rather
than stimu-
lants.Water cold
or nearly so.Oat-bread
toast and
water.Mint-tea
from the
fresh plant.

It is not to be wondered at, therefore, that this disease should, in many instances, prove peculiarly severe. Its symptoms, indeed, are often dreadfully violent and rapidly fatal, as may be seen from Dr. Sydenham's description, which is as follows: Vehement vomitings, and difficult and painful dejections of ill-conditioned fluids; agony, and inflammation of the intestines and abdomen, cardialgia, thirst, a quick pulse, often small and unequal, heat and anxiety, nausea and colliquative sweat, spasms of the arms and legs, fainting, coldness of the extremities, and other symptoms of equal danger, which terrify the by-standers, and kill the patient in twenty-four hours.*

Celsus, who has entered with more minuteness than is common to him into the diagnostics of this species, explains, more fully than Sydenham has done, the exact nature and appearance of the ill conditioned discharges to which the latter refers. "*Bilis supra infraque erumpit, primum aquæ similis, deinde ut in eâ recens caro lota esse videatur, interdum alba, nonnunquam nigra, vel varia.*"† "The bile bursts forth both upwards and downwards; at first like water, afterwards as though fresh flesh had been washed in it; sometimes white, sometimes black, or variegated." And he adds, accordantly with Sydenham, "*quibus concurrentibus, non mirum est, si subito quis moriatur.*" "All these symptoms associating, it is not to be wondered at that the patient should die suddenly."‡

As the general commotion of the alimentary canal is to be referred in this species to a superabundance of bile thrown into it, and probably possessing a peculiar acrimony, our first object in attempting a cure should be, not to excite an additional flow by stimulants of any kind, and especially by violent purgatives and emetics, but to dilute and wash it out of the stomach and intestines by a free exhibition of mild demulcent fluids, as well injected by the anus as given by the mouth. And when this has been accomplished, the spasmodic action of whatever parts are affected may be advantageously attacked with opiates. This was Sydenham's practice, and it cannot well be improved upon.

Those diluents and demulcents are to be preferred which agree best with the stomach, and sit easiest and longest upon it. Celsus recommends a free use of water not quite cold, but only just deprived of its chill; "*aqua, neque ea ipsa frigida, sed potius egelida, danda est.*"§ Lienard, half a century before the time of Sydenham, gave it cold and fresh from the fountain, and, as he assures us, with great success.|| And Cleghorn has recommended the same practice even in hot climates in our own times. Dr. Douglas was peculiarly attached to toast and water, which he made with oat-bread boiled in the water; the bread so thoroughly toasted, that the decoction was as brown as coffee. This has a slight astringency and a little mucilage, and may be a useful diluent; Dr. Douglas declares that he never knew it rejected in any case of cholera. Infusion of spear-mint proves, also, a good anti-

* Sect. iv. chap. ii. As also Epist. de Morb. Epidem. 1675—1680.

† Medicin. Lib. iv. Sect. xi. ‡ Loco citat. § Loco supra-citat.

|| Dissert. Ergo Cholera Morbo Frigidus Potus? Paris, 1626.

emetic, but it should be made with leaves fresh from the garden. Sydenham prescribed weak chicken-broth for the same purpose, and applied it by injection to the rectum, as well as to the stomach. Linseed-tea or barley-water, with a little gum-acacia dissolved in it, may answer as well. As soon as the alimentary canal is thus cleared of acrimonious matter, and the sickness subsides, opium, with or without relaxants, should be administered in repeated doses, to subdue the spasmodic action. Sydenham employed it alone, and in his favourite form of liquid laudanum, varying the dose from twelve to twenty drops in mint-water. Dr. Fordyce, with still more judgment, united it with small doses of antimonials, and thus increased its relaxant power.

But if the onset of the disease be very violent, and the pulse and the general health sink rapidly, opium must be given, and very freely, from the commencement. Cholera is in all cases a very acute disease, and of short duration. I have already observed that it has destroyed in twenty-four hours; these cases, however, are rare. The symptoms generally abate on the second or third day, and the patient recovers rapidly. If there be any considerable degree of weakness on the decline of the disease, it may be necessary to have recourse to the warm and bitter tonics, of which columbo will be found one of the best.

[The following mixture is strongly recommended by Mr. Hope,* of Chatham, for its efficacy in cholera. R Acid. Nitrosi 3i. Mist. Camph. 3viii. Misce et adde Tinct. Opii xl.

One-fourth part to be taken every three or four hours.]

GEN. IX.
SPEC. I.
Cholera
biliosa.

Opium,

with anti-
monials.

When
acute,
opium from
the first.

Warm and
bitter
tonics.

SPECIES II. Cholera Flatulenta.—*Wind Cholera.*

The vomiting and purging rare, or absent; great and oppressive flatulence; retching; flatulent dejections and eructations.

THIS species I have continued from Hippocrates, who denominates it, from the absence of liquid discharges, cholera ξηρα, as Sydenham, by translating the Greek term, has done, *cholera sicca*.†

In this species, the bile, instead of being excessive in its flow, is obstructed or diminished in its quantity, and perhaps secreted with too low instead of too high a degree of pungency. The liver is evidently torpid and enfeebled; and as flatulency is always a sign of debility, we have a full proof that the stomach and intestinal canal are in the same state. We have here, therefore, cholera grafted upon a dyspeptic habit; and as in dyspepsy some quantity of air is let loose from most foods, whether solid or liquid, and an immense portion from many kinds, we are at no loss to account for the flatulency. The absence of evacuations is partly from spasmodic constriction, and partly from a want of wholesome bile, and the retching does not pass into vomiting, because the diaphragm, on whose expulsive co-operation the action of vomiting chiefly depends, forms a link in the

The cholera
sicca of
Hippo-
crates and
Sydenham.

General
character
and pre-
disposing
causes.

Flatulency
whence
derived.

* See Edin. Med. and Surg. Journ. No. 88, p. 39.

† Sect. iv. cap. ii.

GEN. IX.
SPEC. II.

Cholera
flatulenta.
Constitu-
tions chiefly
liable to it.
The
disease not
common :

whence
rejected by
Cullen from
his classi-
fication : and
by others
ranked with
colic ; but
improperly.
Occasional
causes.

Curative
process.

entastatic chain, as is obvious from the increased anxiety of the præcordia.

When cholera, therefore, is an epidemic malady, it will show itself under this form in persons of a highly dyspeptic idiosyncrasy, still more generally than when it appears as a sporadic disease. But the form is not a common one : and hence in the epidemic cholera of 1669, Sydenham declares, that he met with not more than a single instance of it : “ unicum,” says he, “ duntaxat exemplum me vidisse memini ineunte hujus anni autumno.”* And on this account Dr. Cullen has rejected this species altogether ; as others have transferred it to the genus Colica. But as the disease does exist, though it does not occur often, and as the distinguished symptoms of anxiety and spasms of the extremities, which peculiarly draw the line between cholera and colic, are equally present in this and the other species, we cannot disjoin them without confusion. They are produced by the same occasional causes, as surfeit, cold drinks upon a heated body, cold vegetables, as melons, inedible funguses mistaken for esculent mushrooms, poisonous animal and mineral substances ; they all take place sporadically, and all are at times epidemic.

The cure should be commenced with warm cathartics alone, or intermixed with opium, as the compound tincture of rhubarb, or of aloes. Usquebaugh, or the tincture of capsicum, has often also been found useful : and when the paroxysm is removed, the restorative plan should be pursued, which has been already recommended for dyspepsy.

SPECIES III. Cholera Spasmodica.—*Spasmodic Cholera.*

The dejections watery ; ineffectual retchings, or vomitings of a whitish fluid ; spasms successive and violent, often extending to every organ ; great succedency and prostration of strength.

THERE is no species of disease that has of late years attracted more, perhaps none so much, attention, both at home and in the East, as the fatal cholera we are now about to consider.

How far an
epidemy of
modern
origin.

We dare not say that it is an epidemic of modern origin, since it seems to be described by Bontius, and is supposed by some writers to be glanced at by several Greek physicians, and even by Celsus. [Independently of the early notices left us by Bontius, and the more recent ones by Curtis and Paisley in 1774, and by Sonnerat from 1774 to 1781, Mr. Scott† endeavours to prove, that it was described by the medical writers of the Hindoos, and particularly in a work ascribed to Dhanwantari, a mythological personage, corresponding to the Greek Esculapius. He also informs us, that an epidemic prevailed at Arcot and other places about 1781, the occurrence of which was entered in the proceedings of the Madras Medical Board on the 29th of November 1787, in the following terms : “ A disease having in

* Sect. iv. cap. ii.

† Report on the Epidemic Cholera, &c. by W. Scott, fol., Madras, 1824.

October last prevailed in Arcot, similar to an endemic that raged among the natives about Paliconda in the Ambore Valley in 1769—1770, in an army of observation in January 1783, and in the Bengal detachment at Ganjam in 1781, &c., as well as to an epidemic over the whole coast in 1783, under the appearance of dysentery, cholera morbus, or *mordyxim*, but attended with spasms at the præcordia, and sudden prostration of strength, as characteristic marks," &c. Mr. Scott adverts also to the occurrence of cholera in the Mauritius in 1778, and again in 1819; at Madras in 1782; at Vellore in 1787; at Arcot in the same year; in the Northern Circars in 1790; and in the vicinity of Trincomallee about 1804. Some fatal cases are also reported to have occurred at Jaulnah in 1814.] The subject, however, is yet unsettled; and Mr. Annesley will not allow, that the disease alluded to by Bontius, and still more lately by Sonnerat, is the exact disease before us.* But we may at least affirm, that it has of late years assumed an activity, fatality, and extent of range, that it does not seem, from any history that has descended to us, to have possessed in earlier times; and that cannot be contemplated without horror: on which account it has been compared by Mr. Orton to the sweating sickness, and various other pestilences, that, with great fury and mortality, have ravaged the world in former periods.†

Some of the cases that occurred to Dr. Sydenham in the first species of cholera, and which we have already noticed, were so rapidly fatal, that this distinguished pathologist has also been conceived to have been acquainted with the present species, and to have included it under them. But his description does not seem to warrant any such conclusion. Dr. Cullen, in like manner, upon a cursory view, might appear to have had his eye directed to it; for he has loosely copied Sydenham's remark, that cholera is sometimes so severe in its symptoms as to destroy life in twenty-four hours. But on a more attentive survey, it will be perfectly clear, that Dr. Cullen does not even, under this character, refer to the species before us; for he considers an increased secretion and discharge of common or yellow bile as a symptom belonging to every species of the genus; and contends that those cases, which have not this mark, are samples of diarrhœa, or some other disorder, but do not appertain to cholera.

Sauvages seems to have regarded cholera in all its species as a less momentous disease than even Cullen; for though he professes to follow Sydenham altogether in the mode of treatment, he takes no notice whatever of Sydenham's remark, that its symptoms are sometimes so violent as to destroy life in twenty-four-hours. He has given, indeed, from Dellon, a species which he calls *cholera Indica*, but which differs very materially from the present, in being distinguished by delirium, a *strong* though unequal pulse, and a free flow of urine, both red and white, yet always limpid; as though the complaint were accompanied with

GEN. IX.
SPEC. III.
Cholera
spasmodica.

Whether
noticed by
Sydenham;

or by
Cullen.

The de-
scription of
the last does
not apply to
it.

Not noticed
by Sau-
vages.

* Sketches of the most prominent Diseases in India, &c. 8vo. Lond. 1825.

† Essay on the Epidemic Cholera of India, passim, 2 vols. 8vo. Madras, 1820.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

Found
chiefly in
India.

By whom
chiefly
noticed.

Why called
Mort de
Chien.

By whom
named
spasmodic
cholera.
Name
justified.

inflammatory fever. Yet, in the curative process, he advises to abstain from bleeding, and to administer only the milder purgatives.

It is to India, then, and the adjoining countries, that we must look for the most striking, if not the only, form of this species of cholera; and our information must be derived from those who, in modern times, have incidentally noticed it as travellers, or professedly written upon it as practitioners. And from the last quarter we have lately received so extensive a mass of communication, much of it of very great importance, that we are no longer in any degree of ignorance of the general nature of the disease, how much soever we may still be of its remote cause.

Among those who seem distinctly to have noticed it, though in a cursory way, are Sonnerat and Bartolomeo: the first of whom tells us, that it is called by the natives *mordezym*, a term which, according to Bartolomeo, Sonnerat has transformed, rather than translated, into *mort de chien*; but which I am more disposed to think is a corruption of the Arabic MORDEKIE or MORDECHE, the very name by which Dellon says the natives denominated it, and which significantly imports "the death-blow:" according to Goliush, *actio inferens mortem*; and hence synonymous with "*mors repentina*," or "*mors violenta*."

By the name of *mort de chien*, however, in what way soever derived, it is, according to Mr. Curtis,* most generally known in the present day, and particularly at Madras; and under this name, therefore, he has described it. To this gentleman we are indebted for one of the earliest histories of the disease that within the last fourteen or fifteen years have reached our own country; and which, added to Dr. Girdlestone's statement,† began first of all to draw the attention of British practitioners to its truly formidable character.

Mr. Curtis, whose history was published in 1807, regarded it, at that time, as a new disease; and, finding no name for it in the nosological classifications, proposed, from its leading symptoms, to call it SPASMODIC CHOLERA; and as a better name cannot be invented, it is thus denominated in the present work. From the absence of yellow bile, and perhaps of bile of any kind, by which the disorder is peculiarly distinguished, some of the writers in India have objected to the term cholera, as conceiving that such a term necessarily imports a redundancy of this fluid, and that, too, of its natural colour, and other qualities; yet, as I have already had occasion to show, that there is no such necessity whatever imposed on the term, but merely an understanding that the bile is morbidly affected in its secretion, either in quantity or quality of any kind, there is no reason for changing the term on this ground. Nor are there always spasms in any part of the body; for the disease, at least as it has of late shown itself, in some cases destroys instantaneously, and before it has assumed its regular character; but I do not remember to have met with

* An Account of the Diseases of India, as they appeared in the English Fleet, and in the naval Hospital at Madras, in 1782, 1783, &c. Edin. 1807.

† Essay on Hepatitis and the spasmodic Affections of India. Lond. 1787.

a single instance of its having run on for twelve hours, without having developed this essential symptom. It appears, nevertheless, to have raged with much greater and more sudden fatality in 1817 and 1818, than when Mr. Curtis wrote, and it is highly probable, that at that period there was no case in which spasms did not occur.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

Mr. Curtis informs us, that soon after the attack "the spasms began to affect the muscles of the thighs, abdomen, and thorax, and lastly passed to those of the arms, hands, and fingers; but I never," says he, "then or afterwards saw those of the neck, face, or back at all affected. The rapidity with which these spasms succeeded the attack, and their severity, especially as affecting the muscles of the thorax and abdomen, denoted in general the degree of danger in the case. The affection is a fixed cramp in the belly of the muscle, which is gathered into a hard knot with excruciating pain. In a minute or two this relaxes; is again renewed, or the affection passes to others; leaving the miserable sufferer hardly an interval of ease; and lastly it passes from one set to another, leaving the former free."

Description
given by
Curtis.

This account is supported by Dr. Johnson in his valuable "Essay on the Influence of Tropical Climates." Yet, as a proof that the eastern cholera has of late assumed a severer and more fatal character, not only in the Bengal presidency, but in that of Bombay, it is only necessary to observe, that the subsequent cramps regarded by Mr. Curtis, and no doubt justly so, as indicative of the highest degree of danger, have since, as will appear in the sequel, been hailed as less ominous, than many of the symptoms with which the disease now occasionally opens; and contemplated as a reaction of the system, struggling against the first shock; proving that it has not been totally and instantaneously exhausted of sensorial power, as a Leyden phial is exhausted of its electricity by the discharge of the brass rod when applied to it.

Proof of
greater se-
verity in re-
cent times.

The later and more fatal ravage I am now referring to, commenced its attack in August 1817, at Jessore, about a hundred miles to the north-east of Calcutta; and, spreading from village to village, reached Calcutta early in September, having destroyed thousands of inhabitants in its course. From Calcutta it extended to Behar, depopulating many large cities, and compelling the residents to flee for safety to other spots. Benares, Allahabad, Goruckpore, Lucknow, Cawnpore, Delhi, Agra, Muttra, Meerat, and Barcilly, all suffered in succession; the pestilence not diffusing itself at once, but travelling by a chain of posts, and attacking a second district after it had ravaged a first.

Cholera of
1817.

At length it reached the grand army, and spread through its different divisions at Mundellah, Jubbulpore, and Sanger, marching in terrible array over the Deccan. At Hussingabad its havoc was dreadful for several days; when taking a course along the banks of the Nerbuddah it alighted at Tannah. Having visited the famous cities of Arungabad and Ahmednugger, it spread to Poonah, and, in the direction of the coast, to Panwell, where it ramified north and south, crossed Salsette, and arrived

Spreads
westward.

GEN. IX.
SPEC. III.

Cholera
spasmodica.
Spreads
eastward,

to the Mau-
ritius.

Description
of the dis-
ease by
Whyte.

at Bombay in the second week of September 1818, a twelve-month after its appearance at Calcutta.

While this was passing in the west of the peninsula, the epidemic was making a like progress to the east and south, progressively extending over the whole Coromandel coast: whence it was reported to have spread, and a report that afterwards proved to be but too true, to Ceylon; to the pure air and temperate climate of Siam; to Malacca; and, across the straits of Sunda, to China; since which time it has reached the Mauritius; and made its appearance on board vessels both in harbour and at sea. [In the summer of 1821, the disease first made its appearance on the borders of the Persian gulf, after having raged in the earlier months of that year at Bombay. In 1823, it extended itself, in one direction, to the shores of the Caspian sea, and, in another, as far as the Mediterranean, making an apparent stand at Astrachan, and in the neighbourhood of ancient Antioch.* It seems, therefore, to have very closely threatened Europe. It has passed over 90° of longitude, and 66° of latitude; having, in one direction, crossed the equator, and approached the boundary of the southern tropics; and, in another, traversed the northern tropic into the temperate zone.]

The diagnostics of this extraordinary pestilence are admirably furnished for the period before us, by Mr. Whyte, assistant-surgeon to one of the divisions of the army, whose description I shall copy, premising that, while in the centre division the spasms preceded the vomiting and purging, in the others they generally came on after the appearance of these symptoms.

The disease, says Mr. White, commonly begins with a watery purging, unattended with griping or any pain. At an interval of, generally, from half an hour to five or six hours, and sometimes without any interval, the patient vomits a white fluid uncombined in any instance with bile, of which there is abundant evidence in every quarter. The spasms, in the division of the army from which this description is drawn, made their attack at no determinate period of the disease, but in general not for many hours after the commencement of the vomiting and purging. There was soon great debility and sinking of the pulse; the extremities became cold; the eyes sunk in their sockets; the vessels of the tunica adnata were injected with red blood, over which, if the disease advanced, a film was formed; the features expressed the deepest anguish; and the eyelids were either wholly or half closed. The patient invariably complained of great heat at the stomach, and called incessantly for cold drink, although warned of the danger attending its use. The tenesmus now became violent, while nothing was discharged but the fluid just noticed, and a substance like the coagulated white of an egg. The uneasiness and jactitation were so great, that it was with the utmost difficulty an opportunity could be got of feeling the pulse, which by this time was not always perceptible, although

* Dr. Rehman, in Hufeland's Journ. for June 1824, or in Edin. Med. and Surg. Journ. Nos. 82 and 83.

it was generally so till the spasms came on. These were always of the rigid kind, attacking first the toes and legs, and then extending to the thighs, chest, and arms. When they reached the chest the breathing became so difficult, and the sense of suffocation so extreme, that the diaphragm most probably associated in the spasmodic action. [In one case, mentioned by Mr. Scott, where a man had been paralytic in his limbs, with a total numbness of them, they were severely affected with spasms, and became exquisitely sensible.]

GEN. IX.
SPEC. III.
Cholera
spasmodica.

The most unfavourable and dangerous signs in the ordinary progress of the disease were, a coldness of the surface, extending over the region of the heart and stomach. The skin, under the nails, became incurvated; the tongue was icy cold; an universal colliquative sweat broke forth, with a shrivelling of the palms of the hands and soles of the feet: the spasms gradually declining as these symptoms increased. In general all pain and spasm left the patient before death; and even when the heart could not be felt to beat, he expressed himself easy, and said he was better. Sometimes however he was, at this period, in the greatest agony, rolling himself on the ground, groaning, and even bellowing most piteously; signs chiefly occurring in patients who lingered three or four days before death came to their relief.

Symptoms
most dan-
gerous.

[According to Mr. Scott, who has published one of the best descriptions of this disease, the mind remains clear almost to the last moment of existence. A favourable issue is denoted by a rising of the pulse, a return of heat to the surface, an inclination to natural sleep, and a diminution or cessation of vomiting, purging, and spasms; these indications being soon followed by the re-appearance of fecal matter in the stools, of bile, of urine, and of saliva.* The same interesting writer dwells on the rapid sinking of the pulse as one of the most invariable symptoms; the exceptions being only a few, and chiefly where remedies are promptly administered. In an early stage the pulse generally becomes small and accelerated, and, on the accession of spasm or vomiting, suddenly ceases to be distinguishable in the extremities. The length of time, during which a patient will sometimes live in a pulseless state, is extraordinary. Dr. Kellett relates a case, where the pulse was gone within three hours from the attack; yet the man lived in that state from the 3d of October, at four p. m., to the 6th, at two p. m. On the cessation of the spasm or vomiting, and sometimes apparently from the exhibition of remedies, the pulse will return to the extremities for a short time, and again cease. The superficial veins and arteries are not always collapsed, even when the pulse has ceased; and, if opened, they will bleed. Their parietes then collapse, and no more blood can be extracted. In every fatal case, the circulation stops, at least in the extremities, long before death.†]

* See Report on the Epidemic Cholera, &c. p. 21. Madras, 1824.

† Scott, op. cit. p. 25.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

Appear-
ances on
dissection in
natives of
Bengal.

The following appearances are worthy of notice on dissection : an enormous distension of the stomach and bowels, not from air, but a gelatinous substance ; little sanguineous turgescence on the surface of the organs, but an absence of the moisture and glossy character of health ; the liver much enlarged from the quantity of blood contained in its vessels, and, on one part of its convex surface, a considerable extravasation of blood ; the gall-bladder filled with bile, and projecting beyond the edge of the liver ; the bile of a very dark colour, and the gall-ducts pervious. The contents of the small intestines were dark-coloured, apparently from an admixture of bile : the contents of the large intestines resembled the white albuminous matter that was discharged before death. The urinary bladder was quite empty and wholly shrunk into the pelvis : the kidneys apparently diminished : the lungs so much collapsed as hardly to fill one half of the cavity of the chest : no fluid in the pericardium.

Slightly
varied in
Europeans.

Such were the appearances in the body of a Sepoy. In the European subject they were the same, with the two following exceptions : the stomach and intestines were distended with wind, instead of white gelatinous fluid, and hence collapsed upon puncturing them : the veins on the outer surface of both, as well as of the mesocolon, were turgid with blood.]

Dissections
at Madras.

[One of the best descriptions of the appearances on dissection is that published by Mr. Scott, of Madras : and it shows that they vary considerably in different cases. No particular alteration is found, he says, in the serous membranes ; but the mucous ones generally exhibit signs of disease. The lungs are not unfrequently found in a natural state, but more commonly they are gorged with black blood, and assume the appearance of liver or spleen. Sometimes, however, they are collapsed, lying in the hollow at the sides of the spine, and leaving the thorax nearly empty. The heart and large vessels are distended, and sometimes even its left cavities are filled with dark blood. In the abdomen, the vessels of the viscera are turgid. According to Mr. Scott, the stomach generally preserves its ordinary volume, sometimes containing greenish or yellow turbid matter. The intestinal tube is sometimes collapsed, but more frequently filled with air, distended into pouches containing whitish, turbid, dark, or green fluid. No fecal or other solid matters are found in the intestines ; but, very commonly, large quantities of the congee-looking fluid, or of turbid serous matter. The duodenum, and occasionally the jejunum, are loaded with an adherent whitish or greenish mucus ; at other times deprived of their natural mucus, and often quite healthy. Traces of bile in the intestines, or of any substance that has descended from the stomach, are exceedingly rare. Sanguineous congestion, and even active inflammation, Mr. Scott represents as more frequent in the bowels than in the stomach, yet as being often absent. He confirms the account given by other writers of the large quantity of bile in the gall-bladder ; but he adds, that the gall-ducts are about as often constricted and impermeable as in the opposite state. The appearances of the spleen, he says, are so diversified, that they

throw no light on the nature of the disease. The vessels of the mesentery are generally very full of blood. In the head, appearances of congestion, and even of extravasation, have been frequently observed, but not uniformly. In one case, the sheath of the spinal marrow was inflamed.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

The essential morbid appearances, produced by spasmodic cholera, form yet a subject of enquiry; for those which sometimes occur and sometimes do not, cannot be regarded in this light. Perhaps the accumulation of the greater part of the blood in the vessels of the viscera, the absence of all solid or fœcal matter from the intestines, the suppression of the flow of bile into them, the full state of the gall bladder; and the presence of a gelatinous or turbid serous fluid in the bowels, are the changes most inseparably connected with the worst and fatal forms of the disease.]

The disease proved every where more fatal to natives than to Europeans: and among the former no blood could, in numerous instances, be drawn from the arm, however urgent the symptoms.

The Bombay accounts differ in only a few particulars: the spasms were sometimes clonic or agitated, instead of being entastic or rigid. "In a large proportion," says Mr. Orton, "there is no appearance of spasm in any part of the system. In many there is no purging; in some no vomiting; and, in others, neither of these symptoms. I have already observed, that these last were by far the most dangerous cases, and that the patients died under them, often in an hour or two; the nervous power appearing to be exhausted almost instantaneously, like the electric fluid from a Leyden jar. Mr. McCabe, depôt-surgeon at Poonamallee," says the same author, "informs me, that he has found the cases, which to common observation might appear the most desperate (those which were attended with spasms and retchings of extreme violence) actually amongst the most tractable: a truly valuable remark, which my own experience fully confirms. Dr. Burrell saved eighty-eight out of ninety of his later cases,"* meaning those of this kind. And in his general description of them, he says, "that the retching was constant, and the spasms so violent as to require six men to hold the patient on his cot." On the other hand, nothing can be more evident than the intractable and fatal nature of those cases, in which the pulse, instead of rising, sinks at once; in which there are no spasms, and scarcely any vomiting or purging; and in which not only the excretion of bile, but of all the secretions, appears to be entirely suspended.† [It is also particularly remarked by Mr. Scott, that, in the low and most dangerous form of cholera, whether in European or native cases, spasm is generally wanting, or is present in a very slight degree.‡]

Disease as
it occurred
in Bombay.

Sometimes
attended
with almost
instant
death.

Violent
spasms a
sign com-
paratively
favourable.

In a few cases there was even an overflow of yellow bile itself, making an approach to our first species: but these were uniformly of the slightest kind. "The bile," says Mr. Orton,

In slighter
cases some-
times yellow
bile in ex-
cess.

* Bombay Report, p. 68—80. † Essay on the Epidemic Cholera, p. 29.

‡ Report on the Epidemic Cholera, &c.; Madras, 1824.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

"appears in excess only in the milder cases."* And to the same effect Mr. Curtis: "The cases which appeared after this were all of a different nature, much less severe, and none turned out fatal. They were all of them combined with bilious accumulations."†

Instances of
sudden
fatality.

The rapid or sudden fatality of the disease, in its severest onsets, is very singular. Even Sonnerat affirms, "that the patient was frequently carried off in twenty-four hours." But, in the later epidemic of 1817 and 1818, this term was wonderfully abridged. "In the second, and very fatal visitation," says Mr. Orton, "of the epidemic experienced by Brigadier-General Pritzler's force, I am informed that vomiting, purging, and spasms were very frequently, in a great measure, if not entirely, absent; all the powers of the system failing at once, and death commonly ensuing in three or four hours from the attack."‡ Several instances were heard of at Hoobly, and other places, of natives being struck with the disease whilst walking in the open air: and who, having fallen down, retched a little, complained of vertigo, deafness, and blindness, and expired in a few minutes. Mr. Gordon gives a history of many cases of this kind. At Bellary a tailor was attacked with what was supposed to be cholera, and instantly expired, with his work in his hands, and in the very attitude in which he was sitting.§

Appear-
ances on
dissection
in Bombay.

The dissections in this presidency seem to have shown even a more extensive range of visceral effusion, congestion, and extravasation than those in Bengal. Not a single thoracic or abdominal organ was to be traced unmarked by vascular rupture, or turgescence of black-blood, or unstamped with some other morbid appearance; the stomach and liver, however, were chiefly affected, and the urinary bladder was always shrivelled.|| The blood, when drawn from the arm, was found to coagulate very loosely, and sometimes not at all:¶ and the arterial and venous blood were of a like purple hue.**

Estimate of
mortality.

Of the dreadful spread and havoc of this cruel Asiatic scourge we may form some idea, from the report to the Medical Board at Bombay, by George Ogilvy, Esq., secretary. The population in this district alone is calculated at from 200,000 to 220,000; the total number of ascertained cases amounted to 15,945: giving a proportion of seven and a half per cent. Of these cases 1294 sick had been without medicine or medical aid; and there is reason to believe, that of these every individual perished. Mr. Ogilvy, indeed, expressly asserts, that it was not ascertained that any case had recovered in which medicine had not been administered: while it is gratifying to learn, on the other hand, that among those who had received the advantages of the judicious and active plan concurrently pursued, the pro-

Striking
proof of
benefit from
medical aid.

* Id. p. 71. † Diseases of India, p. 66.

‡ Essay on the Epidemic Cholera, p. 41.

§ Bombay Reports, p. 82.

|| Reports of Dr. Burrell and Mr. Whyte.

¶ Orton's Essay, p. 69.

** For the ravage and treatment of this disease in the Madras Presidency, see, in addition to Mr. Scott's Report, "Sketches of the most prevalent Diseases of India, comprising a Treatise on the Epidemic Cholera, &c. By James Annesley, Esq., Madras Medical Establishment. Lond. 8vo., 1825.

portion of deaths was reduced to 6.6 per cent. ; an alarming mortality still, but a marvellous improvement upon the natural course of the disease. In other parts of India, indeed, the deaths, under the same plan of treatment, seem to have been still fewer : for Dr. Burrell, surgeon to the sixty-fifth regiment, at Seroor, out of sixty cases, makes a return of only four deaths ; and Mr. Craw, on the same station, asserts that, on an early application for relief, the disease, in his opinion, " is not fatal in more than one in a hundred cases."

GEN. IX.
SPEC. III.
Cholera
spasmodica.

The curative plan, pursued with so much success, consisted in bleeding, according to the strength of the patient ; calomel in free doses of from fifteen to twenty grains in a dose ; with one or two grains of opium, repeated, if necessary, every four, three, and in some cases every two hours, till the urgency of the symptoms abated ; to these were added a liberal use of the most diffusible stimuli, as the spirit of nitric ether, ammonia, camphor, hot arrack and water, mixed with spices and sugar, camphor-mixture, essential oil of peppermint, the hot bath, stimulant embrocations ; and sometimes the antimonial powder in doses of five grains, given in conjunction with the calomel.

Plan of
medical
treatment.

We are informed of a fortunate blunder in one instance, capable of being laid hold of and applied with great practical advantages. " By mistake, twenty grains of calomel and sixty minims of laudanum were given at an interval of less than half an hour. The patient was inclined to sleep ; nothing more was done ; and in two hours and a half he was as well as ever he had been in his life."

Many of the cases proved successful without the use of the lancet : but, from a return of Dr. Burrell, the hazard of omitting it, whenever blood could be made to flow, seems rather unjustifiable : for, according to this return, out of a hundred patients eighty-eight were bled, and twelve not ; of the former, two died, being one to forty-four ; of the latter, eight, being two-thirds, or nearly thirty to forty-four. The fact appears to be, that scarcely any case occurs without an alarming congestion in one or more of the larger organs ; and hence it is highly hazardous to depend upon stimulants alone, and to boast of their power to subdue the disease without active evacuants in the beginning of the curative process, as Hufeland, and other writers on the continent, appear to have done, without a sufficient knowledge of the real nature of the disease formerly,* if, indeed, it be this species which they have undertaken to describe, of which there is great reason to doubt : and as Dr. Rankeen of the Bengal station has recommended still more recently, who treats calomel with as much contempt as the lancet, and depends exclusively, from the first, upon large doses of opium, and highly pungent and diffusible stimulants.†

Estimate of
advantages
from vene-
section.

and large
doses of
calomel.

Of the remote cause of this extraordinary malady we know nothing. That it is an epidemic, and of a most malignant charac-

Remote
cause of the
epidemy
unknown.

* N. Annalen. i. 404. Gazette Salulaire de Bouillon, 1737.

† Edinb. Med. and Surg. Journ. Jan. 1823, and compare with Dr. Robson's History, id. Oct. 1823, p. 507.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

Intempera-
ment of the
atmosphere
objected to.

ter, is unquestionable; but whether dependent upon an intemperament of the atmosphere, or upon specific contagion, is by no means ascertained. The first was the most obvious mode of accounting for it, and that which was earliest adopted; but by many practitioners it has been rejected, for the following reasons. The disease, instead of spreading from a centre to a circumference, or following the course of the wind, or of the sun, or obeying any other meteorological power, marched by a chain of posts, often in direct opposition to all kinds of atmospherical influence, and in the immediate track of human intercourse. "It prevailed," observes Sir Gilbert Blane, in his remarks upon Mr. Corbyn's letter, "to a degree equally violent at all seasons of the year: in regard to temperature, from 40 or 50 degrees of Fahrenheit to 90 or 100; in regard to moisture, during the continuance of almost incessant rain for months, to that dry state of the atmosphere which scarcely leaves a vestige of vegetation on the surface of the earth."* To which I may add, that it often fought its way in the very teeth of the most powerful monsoons, and left untouched various districts that bordered on its career, and whose less salubrious features seemed to invite an acquaintance with it. It appeared also and vanished in all the changes of the moon, and in all states of atmospheric electricity; and at sea as well as at land. Mr. Corbyn, indeed, gives an account of its having made an attack upon the *Lascars* of an *Indiaman*, in its passage from England to the Cape of Good Hope, in 1814; and that too in the month of January, when the weather was intensely cold.† [It is to be observed, however, that this alleged attack of cholera requires proof of its being similar to the spasmodic cases in India, in which country it had not then arisen in its worst and most fatal shapes. It is even asserted by Mr. Scott, that no instance has ever been recorded of the crew of a ship suffering from cholera, that is to say, the real spasmodic cholera, until the vessel had come into communication with the land.‡ But, if Mr. Corbyn's account be correct, it proves, that the origin of the disease cannot be imputed either to contagion, or to peculiarity of soil.]

Whether
derived
from specific
contagion.

Many pathologists, who suppose the disease to be propagated by a specific contagion, have endeavoured to show, that it appeared in no town or district where a direct communication had not been maintained with some place in which it was prevalent. [They insist on the considerable mortality amongst the attendants on the sick; a point, however, on which much contrary evidence is adduced, and which may perhaps be generally quite as well explained by the exposure of such individuals to the same atmospherical causes, or other circumstances by which the patients themselves were affected. Yet, some facts in support of contagion are strong: the medical officer, Mr. Scott says, in repeated instances, has been the only European in the corps or station who has suffered. Dr. Daun and Mr. Gray, assistant-sur-

* Med. Chir. Trans.

† Treatise on the Epidemic.

‡ Report on the Epidemic Cholera, &c. p. 39.

geon of H. M. 89th regiment, were both seized with the disease, after close intercourse with the sick; and two friends, who attended the latter, were also attacked, while no other European officer of the corps suffered. Another fact, stated by Dr. Kennedy is, that in the course of the twelvemonth ending June 1826, four medical officers of the Bombay establishment out of 116 died of cholera, while among the other gentlemen, civil and military, so great a proportion of casualties from cholera did not occur in the whole course of the epidemic from 1817 downwards.* But, in order to show the contradictory evidence brought forward, it is only necessary to mention, that while one reporter states, that every one of the thirty medical attendants of the 65th regiment was attacked, another declares, that only one out of 101 medical attendants of the Royals had the disease. No doubt, therefore, some important collateral circumstances, adequate to explain this difference, must have existed, though they were not traced and specified. By some reasoners, little importance is attached to the numerous instances recorded, in which the disease, after appearing in a district, has extended itself over it apparently by communication with the sick. Facts of this kind, as a critical writer observes, are easily explained by the non-contagionists, provided it cannot be shown, that *the disease spread gradually, and from the original spot of its appearance as a centre, except where a deviation from its regular course was connected with special intercommunication, or special seclusion.* As the same writer also reminds us, one of the most striking features of a contagious disease is its progressive advancement from district to district, and from country to country, and more especially the *slowness* with which it advances. He joins Sir Gilbert Blane in the belief, that such a character can only be derived from the mode of propagation being by human intercourse. When viewed in relation to this character, the history of the cholera of the East furnishes a very powerful argument in support of its contagious nature. Its slow progress across and down the Peninsula, in 1818, can hardly be explained on any principle, except that of propagation by human intercourse. This intercourse, Dr. Kennedy observes, was established by means of the troops; and it seems, that *since 1817, it has been enforced from one end of India to the other by the annual relief of troops.*† In short, it is argued, that some effectual intercourse must be necessary for the propagation of the disease, on account of the remarkable shortness of its course, and the brief interval which (if it be really propagated by infection or contagion) elapses betwixt exposure and seizure. The two characters will not interfere with the rapidity of diffusion of a contagious disease over a town, or thickly-peopled district; but must render nearly harmless all ordinary communication between one district and another even moderately remote. The cholera

GEN. IX.
SPEC. III.
Cholera
spasmodica.

* See Kennedy's Notes on the Epidemic Cholera, 3vo., Calcutta, 1827. This work, and the writings of Sir Gilbert Blane, contain the best exposition of the arguments in support of the doctrine of contagion.

† Notes on the Epidemic Cholera, p. 53.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

spreads rapidly in a particular spot, but slowly from one part of the country to another. But by far the most unequivocal evidence of the propagation of a disease by intercourse with the sick, is that which is enforced by Dr. Allison; namely, the evidence of the disease breaking out in several previously unaffected districts, at a time corresponding with the arrival in them and sickening of persons, who had intercourse with the sick in an infected district. It is to this criterion chiefly, that we must look for the decision of the question of the contagiousness both of cholera and other diseases, whose propagation by intercourse is at present a subject of dispute.*] Certainly, it is not easy to reconcile the suddenness of its appearance and disappearance with the laws of contagion, so far as we are acquainted with them; a subject we shall have occasion to examine at large, when treating of fevers. Mr. Allardyce, surgeon to his majesty's thirty-fourth, informs us, that in this regiment the disease appeared on the twenty-first of September, and committed dreadful ravages before night. On the twenty-fifth it abated remarkably, and in three days more entirely vanished.† In like manner, the severe attack which was experienced by the Bengal and Madras troops at Nagpore occurred at the end of May 1818. On the tenth of June the rains appeared with great violence, when the epidemic abated, and immediately afterwards ceased. Neither is the idea of a contagious propagation reconcilable with the escape of the great body of persons exposed to the influence of the disease, considering that, from its not being apprehended to be contagious, no means, as is usual in other cases, were employed to avoid the infection.

The state of the atmosphere, as described by Mr. Allardyce, did not differ materially from that in Nagpore. The disease made its attack in close and sultry weather, and vanished after thunder-storms and heavy rains. But we can draw no conclusion from these phenomena; since it seems to have shown itself quite as frequently and fatally after a long succession of rain; and, as already observed, sometimes in very cold and dry weather. The remote cause, therefore, of this mysterious scourge remains yet to be ascertained; and affords farther proof, if indeed proof were wanting, of our general inacquaintance with the nature and economy of epidemics. Mr. Annesley ascribes the disease to an electrical intemperament of the atmosphere, which morbidly diminishes the flow or power of the nervous influence, whence the functions of various organs, and especially the elaboration of the blood, takes place imperfectly, and the general effects follow which we have just contemplated. This hypothesis can be received, however, only as a conjecture destitute of proof.

Dr. Rankeen, who was with the army on the Bengal station in 1818, has referred the disorder to the conjoint operation of sudden changes of weather, humid soil, and damp atmosphere,

No known
combination
of causes.

* See Edinb. Med. Journal, No. 93, p. 426—431.

† Reports communicated to the Bombay Medical Board.

in connexion, more especially, with a diet of rice or other grain, vitiated by the wet of the season.* But we have already traced its existence in cold and dry, as well as in swampy quarters, and have seen it yield to sudden changes of weather, instead of being introduced by them: while the grain and other food of such wet seasons is usually the product of the year before, which may have been peculiarly dry and healthy.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

With the exception of the plague, there is no epidemy on record that seems to have been so strikingly marked by violence and irregularity of action, and especially by a rapid exhaustion of living power; the patient, as we have seen, often expiring within twelve hours from the attack, and sometimes sooner.

General
recapitula-
tion;

The first characteristic feature that occurs to us, on a review of the disease, is the total absence of the bile from the whole range of the alimentary canal in every case, while this fluid was as generally found in abundance in the gall-bladder: and, perhaps, the next is, the turgid, and in some instances, the ruptured state of the liver, from the quantity of blood with which it was distended. The general battery of symptoms appears, therefore, to have been opened by a spasmodic constriction of the bile-ducts; for without such an obstruction, we cannot account for an exclusion of all bile from the intestines. From this point, as from a centre, the spasmodic action seems to have spread in every direction, and under a clonic or entastic form to have seized upon almost every organ: preying with greater violence according to the greater degree of debility, and hence, perhaps, of irritability of the system; into which law we are to resolve it, that the natives, supported by a less rich and nutritive diet than Europeans, suffered more severely, and died more frequently. The stomach and intestines, generally speaking, first participated in the spasm of the bile-canals, and hence the gripping pains, the nausea, and violent commotions which spread from the one to the other.

and deduc-
tions.

In all cases of nausea, from whatever cause, we see the brain and the surface of the body peculiarly diminished in their energy, whence the skin, to the remotest extremities, collapses beneath a deadly chill, and the heart sinks with insupportable languor. In the ordinary course of sickness, the nausea subsides, and the general organization recovers its balance, or it terminates in full vomiting, which excites an universal reaction. And where any such reaction occurred in the disease before us, it was hailed as a favourable change; and hence the wisdom of the stimulant plan, so frequently had recourse to by the medical staff for the purpose of producing a revulsion. But where this was not accomplished, the living power, feebly recruited from its fountain from the first, or not recruited at all, became exhausted in every organ apace, the strength failed, and hope gave way to despair.

Explanation
of various
symptoms.

In the island of Ceylon, where the disease raged with even more violence than on the Indian continent, the patient very

* Edinb. Med. and Surg. Journ. Jan. 1823.

GEN. IX.
SPEC. III.
Cholera
spasmodica.
Vital energy
rapidly
exhausted,

frequently expired in twelve or fifteen hours from its attack. A dissection of those who perished thus early in this quarter has put us into possession of some interesting facts, varying in a few particulars from those that occurred on post-obit examinations in the island of Bombay. The brain was in these cases chiefly the congested organ, the liver sometimes appearing to have no congestion whatever; and hence the inactivity produced in the brain by the nauseating state of the stomach must have been greatly augmented by oppression. Consentaneous herewith, we are told by Dr. Davy, that in some of the cases which he dissected in this region, there was a flaccidity of all the muscular parts, as in animals killed by electricity or hunted to death. There was also a tenderness of the muscular fibres; while antecedently to death, as in many of the Bombay cases, there was no difference in the colour of the arterial and venous blood, and no instance of a buffy coat on the blood that was drawn; which in reality was so loose and uncoagulable, that when venesection was necessary, the vessels were opened with the greatest caution, from the difficulty of restraining the blood afterwards.

as by a
stroke of
lightning.

In all these cases there can be little doubt, that the influence of the brain, essential to the continuance of life, was spent profusely, and soon altogether exhausted: in some instances, indeed, nearly momentarily; like the effects produced upon the animal frame by a stroke of lightning, a violent blow on the stomach, or any other accident that occasions instant death by a total and immediate discharge of the vital energy.

The disease
sometimes
fatal before
a total dis-
charge of
living
power.

In other cases, the oppression on the brain, produced by congestion, seems to have put an end to the conflict before the living power had completely failed, and while it was still acting with irregular accumulation in various organs; for, in these, the muscles of the extremities, and even of the face and lower jaw, were observed to move in a convulsive manner, and sometimes to be drawn into tremulous knots, fifteen or even twenty minutes after death had closed the scene. So the heart of a traitor, when extirpated after he has been beheaded, from a like accumulation of sensorial power, has been seen to palpitate, and even to leap up for several times in succession, after its removal from the pericardium.

Living power
usually
exhausted
more gradu-
ally.

Commonly, however, the living principle seems to have been exhausted more generally and progressively; and the muscles, and, indeed, most of the organs, freed from the tetanic power that at first constricted them, to have been gradually relaxed and flaccid: and hence, that comparative absence of pain that occurred so frequently a short time before death, with a flow of a cold sweat over the surface of the body, and of bile into the smaller intestines.

General
curative
intentions
analyzed.

The grand objects, in the treatment recommended by the medical boards in India, were to equalize the distribution of the blood and nervous influence, to counteract the spastic action so common to the irritable diathesis of hot countries, to guard against the danger of congestion in the vital organs, and to re-

store the natural secretions of the system. The great danger of congestion was guarded against by bleeding; spasm and irritability were opposed by powerful narcotics; and the full and repeated doses of calomel were admirably calculated to act upon the secernents, and restore them to their proper functions, and especially when united, as was occasionally the case, and, perhaps, always ought to have been, with antimonials. All this was sometimes accomplished rapidly, and the disease ceased in a few hours. But if from the violence of the attack, or from any other cause, it could not be accomplished at all, such violence could not long be resisted; and the patient in a few hours, or at the utmost in two or three days, fell a prey to its fury.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

We may also be enabled to see, from the general history before us, why the present species of cholera, or that accompanied with general spasmodic contractions, should occur more severely in the hotter climates of India, or indeed of any torrid region, than in the more temperate ones of Europe. Cholera is particularly characterized by a tendency to spastic action: but hot climates have a peculiar tendency to excite a general spastic diathesis, and to develop this diathesis in some degree or other in all diseases; whence, more especially, the frequency of tetanus upon slight wounds of the extremities, or an exposure of them to sudden chills; and hence, from the co-operation of these two causes, the graft of a spastic disease upon a spastic temperament, the effect must be of a highly multiplied aggravation. It is well known, however, that this spastic temperament, though common to such climates, is by no means common to every inhabitant: and hence again we see a predisposing cause existing in some cases, which does not exist in others, and are able partly to trace the reason why the epidemy should not have been able to fasten upon every individual with equal ease.

The disease
why more
severe in
hot than in
more tem-
perate
climates.

Sir James M^cGrigor has informed me, that the disease in the Mauritius did not appear till after the arrival of a ship on its coast from Ceylon, where the epidemy was raging; some of the crew of which were seized with it on their passage, though all were well at the time of sailing. As a single fact, this is not sufficient to prove contagion; but, in the present uncertainty of the subject, it is a fact worth treasuring in mind.

Late infor-
mation.

[The following statements relate to this interesting but contested point. The disease does not appear to have reached the shores of the Persian gulf by land; but broke out in the seaport and trading towns immediately after the arrival of ships from Bombay. It soon afterwards raged in Schiras, and its extension to Isphahan was greatly apprehended; but the latter city was preserved from it, as is alleged, by the governor-general prohibiting the caravans of Schiras from passing through the place.*]

I have also received information from the Army Medical Board, that the returns for a year and a half, subsequent to the

* Dr. Rehman, in Hufeland's Journal for June 1824.

GEN. IX.
SPEC. III.
Cholera
spasmodica.

beginning of 1824, proved, that the epidemy was then considerably on the decline in India. And I am told from the same quarter that, in a few official documents at the East-India House, which have lately been re-examined, there is reason to believe the present disease is distinctly referred to as having existed in the Bengal territory about a century ago, which will bring it only a little below the time when Dellon published his statement,* and consequently give it confirmation.

Mr. Cornish, in a communication dated Tabriz, in Persia, October 1822, announcing the arrival of this fearful disease on the western boundary of the Persian empire, expresses his belief, that it is an epidemy not dependent on contagion, and then adds the following alarming prediction: "The atmosphere is generally clear, cold, and healthy; and if, in such a climate, this epidemic commits such ravages as almost to equal its effects in many parts of India, I much fear it will extend to Europe, where the crowded cities and great population will make it more severely felt than it has been in the scattered cities and scanty population of Persia."†

Dii, prohibete minas! Dii, talem avertite casum!

GENUS X. ENTEROLITHUS.—INTESTINAL CONCRETIONS.

Stony concretions in the stomach or intestinal canal.

WHATEVER be the degree of merit or demerit that belongs to this genus, the author suspects he must take to his own share; since, so far as he knows, it is yet new to the domains of nosology.

The disease
at times
connected
with other
affections.

In treating of the genus COPROSTASIS, we had occasion to observe, that the natural feces, under circumstances there explained, become at times indurated, shrivelled, and broken down into small balls and buttons, as hard as sunburnt clay, occasionally intermixed with mucus or oleaginous matter. And, in treating of colica, we referred to concretions of a still harder substance, and of a stony appearance, which, though formed in the intestinal channel, are compounded of other materials than the constituent principles of feces.

Name sufficiently
descriptive.

It is for the purpose of including substances of this kind, and which are of very different descriptions, that the present genus has been devised, whose name, ENTEROLITHUS, or INTESTINAL CONCRETIONS, sufficiently indicates a comprehensive scope.

Various
kinds.

We have, indeed, on various occasions, had to give a casual glance at this subject before; and we have particularly observed, that almost all animals are endued with a power of separating or secreting lime and other earths from the blood for particular purposes, as that of forming a shell-covering in insects

* Voyage aux Indes Orientales. Amsterd. 1639.

† Medico-Chir. Trans. vol. xii.

and worms, and of giving hardness to the bones in all other animals. Under a morbid action of single organs, or of the system generally, this secretion often takes place in an undue abundance, and is poured forth into cavities where its accumulation and crystallization must be attended with mischief. Such, at times, is the case in respect to the stomach and intestines. But, independently of concretions derived from this source, we often meet with others, produced by an agglutination or crystallization of the juices which are contained in the aliment, and which, not unfrequently, give immediate proof of their origin by the aromatic taste, smell, or other qualities which they exhibit. There is also a third species of concretion, occasionally to be traced in the alvine channel, of a harder or softer structure, and of a cetaceous or saponaceous feel, which consists of feces, or the refuse matter of the chyle, more or less combined with oil or mucus, and sometimes consisting almost entirely of the two last.

GEN. X.
SPEC. I.
Enterolithus Bezoardus.

As the subject has been never before pursued with a view to any critical examination or systematic arrangement of the tribes of substances that appertain to it, we have not yet perhaps arrived at a knowledge of all their different forms or combinations, as met with in the intestines of man, or the animals of the mammalian class, to which man is degraded by Linnéus: but we may at least venture upon the three following, each of which will furnish a distinct species:

- | | |
|----------------------------|----------------------|
| 1. ENTEROLITHUS BEZOARDUS. | BEZOAR. |
| 2. ————— CALCULUS. | INTESTINAL CALCULUS. |
| 3. ————— SCYBALUM. | SCYBALUM. |

SPECIES I. Enterolithus Bezoardus.—*Bezoar*.

Found in concentric layers, closely agglutinated or chrystallized; capable of a fine polish; frequently with a metallic lustre on the surface of each layer, and an accidental nucleus in the centre; of a spheroidal figure: chiefly consisting of vegetable matter.

BEZOARDUS, or bezoar, is derived from the Persian compound *Padi-zeher*, or *Pad-zehr*, corrupted into *bedzohr*, and *bezoar*. Literally translated, it is *depellens venenum*, and consequently a direct synonym with the Greek term *alexipharmic*.

Specific name, whence derived.

It is found occasionally in the stomach of some of the camel tribes, but more frequently in that of the smaller ruminating quadrupeds, as the goat, and two or three species of the antelope genus, as the chamois, or *wild-goat*, as it is sometimes incorrectly called (the *antelope rupicapra* of Linnéus), and especially that beautiful and elegant animal the *gazhal* (*antelope gazella*, Linn.), the *tzebi* (צבי) of the Hebrew poets, or *roe* of our Bible versions.

Where chiefly found.

The bezoar was formerly employed as a febrifuge and alexipharmic in medicine, and worn as an amulet by the superstitious, who have sometimes purchased a single one from the

Employed formerly medicinally.

GEN. X.
SPEC. I.

Enterolithus Bezoardus.

Not quite certain whether ever found in man.

In one instance apparently so.

External and chemical properties.

East at six thousand livres when very fine, and hired them in Holland and Portugal on particular occasions at a ducat a-day.

It is not quite satisfactorily ascertained that this species has ever been found in the human stomach; we have, indeed, assertions to this effect in various foreign miscellanies,* and I have hence introduced it into the present place. But it does not often appear, that the substances referred to were examined with sufficient attention, while the authors seem to have used the term bezoar in a very loose and indefinite sense. In one of the volumes of the *Annales de Chimie*, however, the analysis seems to have been scientifically conducted. It was made by M. H. Bracconot, from a quantity of concrete materials voided by a female under the care of Dr. Champion, of Barle-duc, which were found to be genuine bezoars.†

The bezoar, as already observed, is chiefly obtained from the stomach of the smaller ruminating animals, whose food, from the complexity of the organ, lies for a long time quiescent in a state of subaction, and is thus enabled to give forth the whole of its juices under circumstances that afford them a much easier opportunity of agglutinating or crystallizing than in many other animals. In the goat kind, these concretions are called *ægagropilæ*, a Greek term, signifying mountain-goat balls. They are of different sizes and figures, the last being chiefly determined by the nature of the nucleus, which, in different individuals, is marcasite, talc, flint, gravel, straw, glass, seeds of plants, &c. In colour they are white, yellow, or brownish; that of the gazhal is greenish-blue; and, when recent, highly aromatic, from the odour of the plants on which the animal feeds. The most singular circumstance belonging to them, is the bronze or metallic lustre that appears on the surface of the different layers, and does not strike deeper than the surface. This, however, is said to be a property peculiar to the western bezoar, and seldom or never to be found in those of the East, which are often of as beautiful a glossy white as ivory. Daubenton ascribes the gilt appearance to a vegetable dye, fixed by the tartaric acid of the plants in which the dye exists; and observes, that he has remarked a like appearance on the grinding teeth of many of the ruminating tribes. A few of them rattle on being shaken, the nucleus having contracted and become loose. La Fosse‡ asserts, that he has occasionally met with genuine bezoars or *ægagropilæ* in the stomach of the horse; and similar concretions seem at times to be formed out of the animal body, as tubercles to the roots or other parts of certain plants: for Fourcroy affirms, that, in the cabinet of Jussieu, he was shown some, curious bezoars of the oriental appearance, white or yellowish, glossy as ivory, and of a spheroidal figure, which were said to be produced by the cocoa.

Spurious bezoars.

From the supposed value of bezoars in medicine, they were at one time imitated, and the false sold as genuine. These sup-

* Samml. Med. Wahrnehm. b. ii. p. 418.—Ferri, *Galeria de Minerva*, 1696. † *Annales de Chimie*, tom. xx. ‡ *Cours d'Hippiatrique*, p. 158.

posititious stones, according to Bomare, were compounded of lobsters' claws and oyster shells, levigated on porphyry, made into a paste with musk and ambergris, and formed into balls of the shape of bezoars; and, where the metallic lines were aimed at, afterwards rolled on gold leaf. The pierres de Goa, or de Malacca, as they were called, were, at least generally, factitious bezoars of this kind; and their spuriousness was capable of proof, by drawing a line with them on a piece of paper previously rubbed over with cerusse, chalk, or lime: the line of the genuine bezoar turns greenish, or of an olive-yellow; that of the factitious remains unaltered. The imposition, however, seems to have been very unscientific, as formed principally of earths, instead of being elaborated from crystallized vegetable juices, which produce this change of colour.

GEN. X.
SPEC. I.
Enterolithus Bezoardus.
Of what compounded.
Spuriousness, how detected.

SPECIES II. Enterolithus Calculus.—*Intestinal Calculus.*

Radiating from a common centre, or formed in concentric layers; mostly with an accidental nucleus; more or less porous; spheroidal or oblong; admitting an imperfect polish; composed chiefly of earths and animal matter.

THIS species is by no means unfrequently found in the human stomach and intestines, but far oftener, as remarked above, in the digestive channel of other animals, and particularly in the larger ruminating quadrupeds, or those with a long complicated digestive organ, where the food, as in the formation of the bezoars, is slowly carried forward; and in tardy draught-horses, particularly those of millers that are fed largely on bran, which seems to yield a ready basis for these concretions.* In Dr. Watson's case, the disease had existed for years: the animal died aged twenty-two, near foaling; but gave no sign of pain or inconvenience till three months before her death. The calculus weighed 15lb. 12 oz.; average diameter $8\frac{1}{2}$ inches by 8 inches.

Where chiefly found.

When chemically analyzed, they are chiefly found to consist of a triple or ammoniaco-magnesian phosphate, like the earthy or white-sand calculi of the human bladder; though it is difficult to conceive from what quarter the magnesia is obtained. In the case of millers' horses, some portion of this earth may perhaps be derived from the bran, in which it is always to be traced; but the difficulty still remains with respect to other animals. The figure, whatever be the size of the calculus, is usually spheroidal, except where broken into separate fragments: the matter is deposited for the most part, as in the former species, upon a nucleus of some sort or other; as a small piece of flint, an iron nail, a seed or husk, a piece of hay or straw; the structure sometimes radiating from such common centre to the surface, and sometimes evincing distinct plates,

Chemical analysis.

* Phil. Trans. xxiv. 1705, Thoresby. Id. xlv. 1746, Bailey. Id. xlviii. 1745, Watson.

GEN. X.
SPEC. II.
Enterolithus Calculus.
Illustrated
by singular
examples.

more or less united to each other. In the human subject, these calculi vary from the size of a pea to that of a filbert, chestnut, or hen's egg, and are often still larger. In the case of Margaret Lawer (related under *Colica constipata*,)* they were usually of the two former sizes, and appear to have been formed in great abundance, and with wonderful facility; for her abdomen, upon pressing it, often rattled, from the quantity it contained, with the sound of a bag of marbles. Many of these were rough and sharp-pointed at the edge, evidently fragments or nodules of larger concretions, and gave great pain in the rejection, whether above or below, for they were discharged both ways. The larger-sized weighed rather more than two drachms; and Dr. König, who relates the case, calculated that the whole that were discharged during the continuance of the complaint could not amount to less than 5lb. avoirdupois. In a case related by Mr. Martineau,† some of them, much larger than the preceding, were voided per anum, by a poor woman in the third month of pregnancy, after having suffered from colic about four or five days: of these, the largest, 8 inches in circumference, and 6½ inches in length, weighed two ounces, sixteen pennyweights, and twelve grains. In this case, and in various others, the calculi seem to have been in the intestines for a considerable period of time without inconvenience; for it is hardly possible to conceive, that all these should have been produced in the course of a week. In another case in the same journal,‡ related by M. Mackarness, a calculus of this kind was extracted with some difficulty from the anus, by the surgeon who attended, which weighed eight ounces and a half, and was ten inches and a half in circumference. It is described as "a hard, unequal, ragged, flinty stone," but was not examined chemically. It had been in the pelvis, and nearly of its full size, for several years before its extraction; for the patient's stools were always obtained with difficulty; and three children, which she had successively borne in the three preceding years, were all marked with a large hollow or indentation in some part of the head; in one instance, of sufficient extent to hold the moiety of a small orange.

Other examples, however, have occurred both of as large a size, and of as firm or flinty a crystallization. Thus, in a foreign miscellany of authority, we have the case of a calculus discharged by the anus of half a pound weight;§ and M. Daabal has published a full account of fragments of stony calculi (*saxea fragmenta*) evacuated from the same organ:|| as Sir H. Sloane has another case in which the concretions amounted to two hundred.¶

In draught-horses and oxen, this species of calculus is generally found single and much larger, and often of little inconvenience for years. They vary in size from three pounds avoirdupois to ten or twelve. Of this last weight the author

Found large
in draught-
horses, &c.

* Ut suprâ, p. 252.

† Phil. Trans. vol. xxxii. 1722—1723.

‡ Ibid. vol. xli. 1739—1741.

§ Samml. Med. Wahrn. band ix. p. 231.

|| Discursus Academicus de Esthæra Norra. Lund. 1715. 8vo.

¶ Birch, Hist. 1685.

once met with an instance in a horse belonging to Mr. Hayward, a respectable miller of Brundon, near Sudbury, in Suffolk; and Mr. Watson gives an account of two considerably heavier, one already noticed, and the other weighing nineteen pounds, exclusive of the outward shell or crust, which was broken off in several pieces, with a circumference of twenty-eight inches. Both these were laminated, but “had the appearance of a pebble; yet the specific gravity was much lighter, the first weighing in water not more than six pounds. At other times the crystallization is more like that of gneiss, or of grit-stone, and almost always light and porous.*

GEN. X.
SPEC. II.
Enterolithus Calculus.

Occasionally, however, this species is found gregarious instead of solitary. Mr. Watson, in the article just quoted, mentions a case of *several* found in the intestines of a mare, and presented to the Royal Society by the Duke of Richmond, in 1746, the nucleus of two of which was found to be an iron nail. And, by turning to another volume of the same journal,† we find these calculi described by Dr. Bailey (for the two articles appear to relate to the same case) as consisting of five in number, of different sizes, some triangular, and resembling a horse-bean, of an olive colour, and finely polished; and one much larger, weighing nearly sixteen ounces troy, and measuring twelve inches by eleven.

Sometimes gregarious.

Several of these concretions, we have observed, had the appearance of crystallized gneiss, or of grit-stone; and it is probable, that they were partly of these very minerals; for it is of such that mill-stones are very generally composed: and, by the friction they are perpetually undergoing, there can be little doubt that much of the mill-dust intermixed with bran, with which millers' horses are fed so largely, is derived from the powder furnished by these stones.

Apparently gneiss, or grit stone.

In man, the calculus is often dependent upon a like accidental origin; for it not unfrequently follows upon a long, free, and injudicious use of prepared chalk, magnesia, or other calcareous earths, for the purpose of correcting acidity in the stomach. I have known this happen in many dyspeptic cases; and once attended a lady who, from the same cause, laboured under a most painful constipation, till a large mass of what may be called intestinal mortar was removed by a scoop from the rectum. The case, related by Dr. S. Fitzgerald, of Mullingar, was apparently produced by a like cause. The lady had suffered great torture in the hypogastric region, particularly towards the back and oss sacrum, for eighteen months; during the last three of which she could not leave her bed, except for tepid bathing, which afforded her transient ease. Upon the rejection of an emollient anodyne clyster, she discharged with it a large hard calcareous ball, of an oval figure, weighing eight ounces and three drachms, exceeding in size an ordinary orange, and so solid that nothing less than the stroke of a hammer could

In man, produced by an injudicious use of calcareous earths.

Illustrated.

* Phil. Trans. vol. xxxiv. No. 393.

† Phil. Trans. vol. xlv. 1746.

GEN. X. break it. A total liberation from pain immediately followed,
SPEC. II. and the patient progressively recovered.*

Enterolithus Calculus.

Curative process.

The curative process may be comprised in a few words. If the concretions proceed from an injudicious use of calcareous or magnesian earths, both these must be avoided for the future : and the calculi actually existing be diminished in their diameter by the use of mineral acids, and quickened in their passage by cathartics. If magnesia be the agglomerating base, the sulphuric acid will be preferable, as this will have a tendency to convert it into Epsom salts, and thus produce a purgative as well as a solvent effect. If we have reason to suspect a calcareous diathesis as a sole cause, since this diathesis usually depends upon debility, we must endeavour to invigorate the system generally, and the stomach more particularly, by the course of regimen and medicines already prescribed under DYSPEPSY.†

SPECIES III. Enterolithus Scybalum.—*Scybalum*.

Concretion soapy or unctuous, mostly continuous ; sometimes in layers ; spheroidal or oblong ; consisting chiefly of mucus or oleaginous matter, more or less intermixed with indurated feces.

Has been hitherto little attended to.

THIS species has not hitherto been sufficiently attended to ; and even Fourcroy and Walther seem to have mistaken it for a biliary calculus ; an error which the writer has seen in several instances repeated in this metropolis. The specific character sufficiently expresses the general nature of the concretion, and is drawn up from various examples that have occurred to himself, or have been shown him by others.

Three sorts peculiarly noticeable.

The concretions belonging to this species, if carefully watched and analyzed, would probably be found very numerous ; but, in the present state of our knowledge upon this subject, we must confine ourselves to the three modifications of feculent, oleaginous, and umbraceous, or that of ambergris.

Feculent or common scybala.

When, from a feeble peristaltic action, the feces have remained long in the colon, they are frequently found to undergo a considerable change ; for they become harder as their more liquid parts are absorbed ; and, in consequence of becoming harder, frequently stimulate the mucous glands by which they are surrounded to a more copious secretion, which intermixes with them ; and, as they break into indurated balls or fragments, gives them a less rough or a more greasy or unctuous feel. These are the common scybala of medical writers.

Oleaginous scybala.

But we occasionally meet with balls, buttons, or globules of a still more cetaceous, fatty, or oily substance, discharged, sometimes solitarily, sometimes gregariously, from the rectum, of very different diameters. Occasionally we can trace them to a like origin, as in a case quoted by Sir Everard Home†

* Edin. Med. Comment. vol. viii. p. 329.

† Marcet, Essay on the Chemical History and Medical Treatment of Calculous Disorders, 1817. ‡ Phil. Trans. year 1813, art. xxi.

from Dr. Babington, in which the lady who voided them had regularly, before their appearance, taken one or more doses of olive-oil to appease severe pains in the stomach which were ascribed to the passing of gall-stones, for which these concretions were at first altogether mistaken. They were of a globular form, "varying in size from that of a small pea to the bulk of a moderate grape, of a cream-colour, and slightly translucent, of a sufficient consistence to preserve their form, and to bear being cut with a knife, like soft wax."

GEN. X.
SPEC. III.
Enterolithus Scybalum.

In general, however, we cannot trace these concretions to any unctuous material introduced into the stomach; and have reason to believe them produced by intestinal secretion, or a chemical change effected on the recrement of the food after it has passed into the larger intestines. Dr. Babington has also furnished, in the same article, a case, which can only be resolved into an origin of this kind. The patient was here a little girl of four years and a half old. At the age of three, "her mother observed something come from her as she walked across the room, which, when examined, was found to be fat in a liquid state, which concreted when cold. Ever since that time to the present she has voided, at intervals of ten or fourteen days, the quantity of from one to three ounces, sometimes pure, at others mixed with feces: when voided, it has an unusually yellow tinge, and is quite fluid like oil. Her appetite is good, as well as her spirits, and her flesh firm: her belly rather tumid, but not hard: she is subject to occasional griping."* A free evacuation of the same kind occurred to Dr. Kuntzmanz of Berlin.†

Globules, and balls of fat, discharged from the rectum, are noticed in various medical collections of high authority both domestic and foreign.

Thus, in the Edinburgh Medical Essays, we have an instance of a whitish substance like tallow or hardened marrow, being a congeries of globules, passed among the excrement, the entire mass making the size of a walnut; other masses having been passed several days afterwards of the size of so many peas.‡ The Paris Academy of Surgery have published similar accounts.§ So Dietrich gives the case of a waxy mucous matter—*materia ceracea mucosa*—passed by the rectum, weighing more than an ounce:|| and Paulini notices several instances that had fallen within the range of his observation;¶ in one of which the concretions were of a green hue. Vander Wiel describes a case of the same appearance:** and Zeller has found them loaded or covered with hairs,‡‡ probably swallowed accidentally. So, in the *Acta Naturæ Curiosorum*,‡‡ we have an instance very like the first of Dr. Babington's cases; the concretions were dejected in a paroxysm of colic, and are des-

Varied in colour or by combination.

* Loco citat. † Journal der Practischer Heilkunde von Hufeland, July 1821. ‡ Vol. i. part. ii. art. lxvi. p. 145. § See especially Hist. de l'Acad. Royale de Chir. iii. p. 14. || Observations quædam rariores, &c.

¶ Cent. i. Obs. 15. ** Stalpart Vander Wiel, Cent. i. Obs. 61.

‡‡ Dissert. Molæ viriles memorab. Tubing. 1696. ‡‡ Vol. iii. Obs. 51.

GEN. X.
SPEC. III.

Enterolithus Scybalum.

cribed as “excreti globuli, quasi saponacei, cedente dolore hypochondriorum.” And I suspect we are to refer to the same species a case ascribed by Dr. Scott, of Harwich, Roxburghshire, to hydatids, or something resembling them.* The patient had for many months been occasionally subject to colic and dyspeptic affections, accompanied with great pain and faintness. He at length “began to void by stool substances of a brown colour, some about the size of nuts, and some as big as walnuts, which were bags that contained matter of a yellow hue like pus, besides a great many empty ones that had broken. I have seen eight or ten passed in one stool.” This continued for eight or ten days, and the patient then recovered.

Accompanied with coprostasis obstinata.

In all these cases we find proofs of morbid intestinal action, commonly accompanied with pain and *coprostasis obstipata*, or costiveness from weakness and torpitude in the vermicular movement of the intestines.

Ambraceous scybala, where found chiefly.

It is under like circumstances that the substance called ambergris, is found in the larger intestines of the cachalot, or spermaceti-whale (*physeter macrocephalus*, Linn.), which generally contain sixty per cent. of fat, and is never higher up than six or seven feet from the anus. It appears to be more completely elaborated in proportion as the animal is more sickly and affected with costiveness, and does not dung on being harpooned; and hence, the most valuable, according to the report of the South Sea whalers, is that which is extracted from animals that have died of the complaint. It is found in masses of from fourteen to more than a hundred pounds weight; and appears at first to bear a close resemblance to the feces of the whale, but hardens on exposure to the air. The largest lumps have probably not been discharged, but separated from the body of the animal during the process of putrefaction after death. Neumann gives an account of one mass found on the coast of the island of Tidor, that weighed not less than a hundred and eighty-two pounds.† It was purchased of the king of Tidor, by the Dutch East India Company, in 1693, for eleven thousand dollars, and measured five feet eight inches in thickness. It was long exhibited at Amsterdam, and at length broken up and sold. Other masses of many pounds weight have been found floating on the sea: and the concretions, thus detached and of different bulks, are carried into every quarter by the tides and currents, and have sometimes been found on the shores of the West Indies; whence Waller:

Sometimes in immense masses.

Often found on the coasts.

Bermuda, wall'd with rocks, who does not know
That happy island where huge lemons grow?
Where shining pearl, coral, and many a pound,
On the rich shore, of AMBERGRIS is found.

Sometimes in harpooned whales,

Sometimes, however, it is traced in great abundance in the intestines of whales that are harpooned, and which, probably, would soon have died of an obstruction in the bowels, if they had not been taken. A captain in the Southern Whale Fishery,

* Edin. Med. Comm. vol. v. p. 183. † Phil. Trans. vol. for 1734.

examined before the privy council in 1791, related that he had found three hundred and sixty-two ounces of this substance in the intestines of a female, struck off the coast of Guinea; part of which was voided from the rectum on cutting up the bladder, and the remainder traced in the intestinal canal.* The mass is usually loaded with hard bony fragments, by the sea-men called squids, which are the beaks of the cuttle-fish, on which the whale is known to feed.

GEN. X.
SPEC. III.

Enterolithus Scybalum.
usually loaded with other materials.

When recently taken, the smell of ambergris is very strong, and rather fetid, but, by keeping, the offensiveness goes off, and it acquires a faint musky odour. It has scarcely any taste. Its colour is ash-gray, or brown, somewhat mottled: its hardness is sufficient to render it easily friable, but not to bear a polish; when broken down, it has a soapy feel like steatite.

Sir Everard Home has endeavoured to account for the production of all these varieties of scybala, and to show that, while it is the office of the stomach and intestines to furnish nutriment for the muscles and membranes out of the finest parts of the food which is separated from the rest for this purpose, it is in like manner the office of the larger intestines, and especially of the colon, to convert a considerable part of the refuse matter into fat, by combining it with the bile, and to send it, thus changed in its nature, by channels of which we know nothing, into the circulation, and deposite it in almost every part of the body, to lubricate the whole, and especially to promote the growth of the animal frame in youth.†

How accounted for by Sir E. Home.

It is unquestionable that, with all our advances in the knowledge of physiology, we are, to this hour, in great ignorance of the means by which the fat of the different parts of the body is produced, or the quarters from which it is drawn. But it militates against the hypothesis before us, that we have no instance of the existence of fat in the larger intestines when they are in a state of health; and that to produce scybala of every kind, and particularly those that are more oleaginous, a weak and diseased condition of the intestinal canal appears to be indispensable. Whilst in the second case related by Dr. Babington, in which the fatty material seems to have been elaborated in its most perfect state, the bile does not appear to have been at all transformed from its natural to any new character, nor indeed to have been in any degree operated upon; for we are expressly told, that the material when voided had "an unusually yellow tinge," notwithstanding that it was "quite fluid like oil."

Objection to the hypothesis.

The subject, however, is worth pursuing: and Sir Everard has endeavoured to support his views by a later article inserted in the same work, on the transmutation of the tadpole into a frog,‡ in which, after showing that the intestines of the tadpole are much larger and more complicated than those it possesses in its frog state, he argues, that this more extensive and elaborate machinery is for the purpose of forming a larger abundance

Hypothesis supported by the transmutation of the tadpole.

* Phil. Trans. vol. lxxxi.

† Phil. Trans. for 1813, art. xxi.

‡ Ib. 1816, p. 301.

GEN. X.
SPEC. III.

Enterolithus Scybalum.

of oleaginous matter as food, at a period when the animal is less capable of obtaining food from without ; and he observes farther, that the intestinal canal of the tadpole is surmounted with, and, in some species, imbedded in fat.

GENUS XI. HELMINTHIA.—INVERMINATION. WORMS.

Worms or larvæ of insects, inhabiting the stomach or intestines.

The subject new to nosological classifications.

THE subject of our last genus, I observed, was new, or nearly so, to the science of pathology : that of the present is equally new to nosological arrangement : for it is a singular fact, that, while almost all systems contain a distinct genus under the name of phthiriasis, or malis, or cocyta, and some of them two distinct genera, for the purpose of arranging such insects, larvæ, or vermicles as are occasionally found infesting the surface of the body, and which, to avail ourselves of a significant term derived from old English botany, may be called animal *douders*, few or none of them comprise any division whatever for intestinal larvæ or worms, notwithstanding the infinitely greater mischief they often produce, and the far greater difficulty of getting rid of them.

Dr. Cullen sensible of the omission, and intended to supply it.

Dr. Cullen, indeed, in the latter part of his life, was sensible of the importance of this omission, and would most probably have corrected it in his own system, had he found leisure or inclination for a revisal of it, since he has introduced the term VERMES into his "*Catalogus Morborum, a nobis omisissorum, quos omisisse fortassis non oportebat.*"

The omission abundantly atoned for by pathologists ;

especially of the Linnæan school ; who have referred most diseases to vermination.

In many instances, however, physiologists and pathologists have abundantly supplied the deficiency ; for there is scarcely a disease of any kind which has not been referred by some of them to vermination as its origin. This is particularly true of the school of Linnæus, though it is not confined to that seminary. Thus Linnæus himself laboured hard to prove, that dysentery is the effect of a peculiar larva or grub belonging to the acarus or tick genus, which he has ventured to introduce into his Natural History under the name of *acarus dysentericæ*. So Kircher has ascribed the plague to another kind of animalcule ; Langius, the measles ; various authors, the itch ; Siggler, petechiæ ; Lusitanus and Poncellus, small-pox ; De Sault, lyssa, or canine madness ; Hauptman, syphilis ; Martin and Udman, both pupils of Linnæus, elephantiasis ; and Nyander, another pupil of the same great teacher, contagious diseases of most, if not of all kinds. Some again have ascribed piles to the same source ; others, the inspissated and vermiform mucus squeezed out occasionally from the excretory ducts of the small mucous glands of the forehead, in the present system described under the genus and species *ionthus varus* ; and others again, the tooth-ache : which last opinion seems at one time to have been adopted generally ; for we find Shakespeare making one of his best drawn characters exclaim—

What! sigh for the tooth-ache!
Which is but a humour or a worm.

GEN. XI.

Helminthia.

Extensive
application
of the *tænia*
hydatid.

It is not very wonderful, therefore, to behold the extensive use to which the *tænia hydatid.*, or hydatid, is applied in modern times, so as to be regarded as the parent of almost every limpid cyst discoverable in the body; nor that cancer of the breast should be ascribed to a similar generation; and the less so, since it is not a century ago, that it was gravely argued by the most enlightened physiologists of the day, and supposed to be ocularly and irrefragably demonstrated, that man himself is, in every instance, the progeny of a similar kind of maggot, which, it was said, might be seen by any one who would take the pains to look for it, vivaciously frolicking in the vast ocean of a drop of male semen.

Man him-
self once
supposed to
arise from a
like source.

We are, at length, approaching to more sobriety in our observations and enquiries; and it is high time such a period should arrive; for we were in great danger of running into the wildest fancies of equivocal generation, and of equally relinquishing all principles and all limits in natural history. We now know, that an incipient stage of putrefaction, or a very short quiescence and exposure of animal fluids to a warm atmosphere, is sufficient to load them with animalcules of some kind or other; not, indeed, by fortuitously converting the constituent and decomposing principles of such fluids into the simple forms of microscopic life (for of this we have no proof whatever), but rather, by affording to some few of the myriads of invisible ovula with which the atmosphere swarms, and which it may convey to them, the proper nidus, or the quickening stimulus they stand in need of. [As a judicious writer remarks, the hypothesis of worms being the product of putrefaction only proves, that the believers in it had never examined the generative organs of those animals.*]

Mischief of
indulging
in such ex-
travagances
of physio-
logy.

Real origin
of such
parasitic
animalcules.

Invisible
eggs floating
in the at-
mosphere.

That the atmosphere is freighted with myriads of insect-eggs that elude our senses, and that such eggs, when they meet with a proper bed, are hatched in a few hours into a perfect form, is clear to any one who has attended to the rapid and wonderful effects of what, in common language, is called a blight upon plantations and gardens. I have seen, as probably many who may read this work have also, a hop-ground completely overrun and desolated by the *aphis humuli*, or hop green-louse, within twelve hours after a honey-dew (which is a peculiar haze or mist loaded with a poisonous miasm) has slowly swept through the plantation, and stimulated the leaves of the hop to the morbid secretion of a saccharine and viscid juice, which, while it destroys the young shoots by exhaustion, renders them a favourite resort for this insect, and a cherishing nidus for the myriads of little dots that are its eggs. The latter are hatched within eight-and-forty hours after their deposit, and succeeded by hosts of other eggs of the same kind; or, if the blight take place in an early part of the autumn, by hosts of the young in-

Proof of the
assertion.

Blight in
hop-
grounds.

Honey dew,
what.

Favourite
food of the
aphis
humuli.

* Merat, in Dict. des Sciences, Med. tom. lvii. p. 215.

GEN. XI. sects produced viviparously; for, in different seasons of the year, the aphid breeds both ways.

Ovula floating in the atmosphere probably in calculably less than those of the aphid. Now, it is highly probable, that there are minute eggs, or ovula, of innumerable kinds of animalcules floating by myriads of myriads through the atmosphere, so diminutive as to bear no larger proportion to the eggs of the aphid than these bear to those of the wren, or the hedge-sparrow; protected at the same time from destruction by the filmy integument that surrounds them, till they can meet with a proper nest for their reception, and a proper stimulating power to quicken them into life; and which, with respect to many of them, are only found obvious to the senses in different descriptions of animal fluids.

The same fact found in the mineral as in the atmospheric kingdom.

Found also occasionally in buildings.

Possibly in abscesses and exanthems.

Hence animalcular eggs are perhaps capable of being hatched in other substances than animal fluids.

Animalcules not necessarily produced by spontaneous generation.

The opinion illustrated by discoveries in natural history. Rolander.

Lister.

The same fact occurs in the mineral kingdom; stagnant water, though purified by distillation, and confined in a marble basin, will in a short time become loaded on its surface or about its sides with various species of confervas; while the interior will be peopled with microscopic animalcules. So, while damp cellars are covered with boletuses, agarics, and other funguses, the driest brick-walls are often lined with lichens and mosses. We see nothing of the animal and vegetable eggs or seeds by which all this is effected; but we know, that they exist in the atmosphere, and that this is the medium of their circulation. How far the tales may be true, of living animals found in abscesses in different parts of the body, and especially in scirrhus and pustulous exanthems, this is not the place to enquire; but, conceding the fact, we can only account for it by supposing their respective ovula to have been admitted into the system with the air or food we take in; and to have been separated as soon as they acquired possession of a proper nursery.

We have strong reason to believe, however, that many of the eggs or animalcules that are traced in animal fluids, occasionally find other receptacles out of the body that answer their purpose as well, and seem to keep up their respective species; and, consequently, that provide a stock of eggs, larvæ, or insects, prepared to take possession of any decomposing animal substance as soon as it is ready for their reception. And we are hence able to account for the presence of animalcules in such situations, without being driven to the necessity of supposing them to have been generated therein; and see how it is possible that they should continue to exist in a regular chain of succession, instead of being produced anomalously and equivocally by the *bildungstrieb* (as the German physiologists call it), or formative effort of a living principle, in substances in which life has confessedly ceased to exist.

Thus Rolander, who, like Linnæus, ascribed dysentery to the dysentery-tick, or *acarus dysentericæ*, and who himself laboured under this disease while residing in Linnæus's house, contended that he had discovered the same insect in a water-vessel made of juniper-wood; and conceived that it was conveyed in great numbers into his body by the water which he drank from the cistern. So Lister affirms, that he has seen the *ascaris vermicularis* (the maw or thread-worm), which is usually found burrow-

ing in the lower part of the intestines, infesting the surface as well. In like manner Palmærus has rendered it at least probable, that the young, or ova of the *fasciola hepatica*, or fluke, found so abundantly in the liver of sheep that die of the rot, and the origin of which has so much puzzled the naturalists, are swallowed by the sheep in marsh or stagnant waters. And Linnæus himself pointed out, that the *tania solium*, or tape-worm, the cause of whose existence in the alvine channel has been a source of equal difficulty to the physiological enquirer, exists, though much smaller, in muddy springs; and notwithstanding that Pallas, at first, expressed doubts upon this point, the assertion has been since confirmed by additional and satisfactory observations.

GEN. XI.
Helminthia.
Palmærus.

Linnæus.

[The *ascaris vermicularis*, which used to be considered peculiar to the human body, has been proved by Dr. Barry, of Cork, to be derived from without; as worms, differing from *ascarides vermiculares* merely in colour, were traced by him, in one instance, to the well of a particular country-house, two miles from Cork, where the whole family, and every other person that drank the water, invariably became afflicted with *ascarides*.* The argument, with which all statements of this kind are generally met, is that intestinal worms cannot live out of the body, and therefore they must differ from worms, more or less resembling them, found elsewhere: yet, it is possible to conceive, that an animal that is hatched and attains its growth in a particular temperature, unexposed to the air, may not be able to sustain the sudden removal from its warm sheltered nursery, though it might have thriven in a much colder and more exposed situation, had it never been made too tender by the influence of habit, &c. Worms of the human intestines die, not only soon after their discharge from the body, but frequently even before they are voided, when the health of the individual is much disordered by fevers. They also invariably perish with the patient; when the supply of their wonted nutriment may be supposed to cease, and the temperature to which they are accustomed is rapidly lessened. Some writers state, that worms never meddle with the alimentary matter in the bowels, but derive their nutriment by suction from the substance, or vessels of the viscera; while others represent those worms, which occupy the small intestines, as feeding on the chyle itself. The editor is not aware, that any decisive evidence, exclusively supporting either of these opinions, is on record.]

Is it not surprising, that doubts should at times exist in the mind of the precise and cautious enquirer in many cases of this kind, which can only be removed by a long and attentive investigation of the history of the minute animals which gives rise to them? for, first, the very same species assumes so different an appearance in different stages of its existence, that nothing but the most patient prosecution of the same individual through all

Doubts
upon the
subject,
whence de-
rived.

* Barry on the Origin of Intestinal Worms; see Trans. of the Association of Physicians, &c. Ireland, vol. ii. p. 389.

GEN. XI. his metamorphoses, could induce us to put any faith in its individuality. For who, for example, if he did not know it by the repeated experience of himself or of others, could believe that the black and the white carrion-vulture of America (*vultur aura*, Linn.), which, when teased, emits a cry like a mouse, are the same bird, merely changing from white to black as it grows old? Who could divine that the tadpole, possessing gills and a fish tail, and without legs, should be the same animal, only younger, as the four-legged frog that has neither tail nor gills? or that a like identity should apply to the caterpillar, the aurelia, and the winged moth? But, secondly, we often see an almost equal change produced in a few generations of the same species, and occasionally in the same individual, by a change of food or habitation, or both. How widely different is the domestic sheep from the argali; or the ox from the bison! yet these are the stocks from which they have proceeded. A difference of food alone produces a growth and development of sexual organs in the honey bee, and converts what have hitherto been called neuters (but which are really imperfect females) into queens, or bearing bees. In many instances, we can trace changes as considerable (and shall presently have occasion to remark them) in worms, or the larvæ of insects, introduced accidentally into the human intestines from without. Several of these, however, are animals with the whole of whose history we are acquainted: but we are not acquainted with the whole of the history of the ascarides, the tænia, and various other intestinal worms; and hence might not know them out of the body, even though we should actually meet with them under some form or other.

First, from the different appearances of the same animal in different periods of life.
Examples.

Secondly, from a difference of appearance produced by a difference of food.
Examples.

Plants parasitic to animals.

As animalcules are parasitic to plants, so are plants at times parasitic to animals. As I have seen funguses spring up night after night on the sheets of patients with gangrenous limbs, where the corrupt discharge has soaked into the sheets, and rendered them a quickening nidus. Several species of clavaria grow on the chrysalis of one or two species of cicada, and even on the perfect insect itself, as others do on the May-fly.* Were this indeed the proper place for pursuing so interesting a study, I could show not only that there is scarcely an animal of any class or order, from the highest to the lowest, but is a prey to other animals of a minuter form that infest its interior as well as its surface, but that there is scarcely a vegetable which has not also its parasitic plunderers, and is infested in like manner. But the subject would carry us too far: yet a few additional hints in relation to it are given in the comment to the Nosological System, and those who are desirous of extending the study may turn to them at their leisure.

[It is asserted that ascarides are sometimes viviparous; but the generality of the best modern writers on intestinal worms do not adopt this view, but regard them all as constantly oviparous.†

* Mémoires sur des Insectes sur lesquelles on trouve des plantes, par M. Fougereux de Boudero. Vide Hist. de l'Académie Royale des Sciences, An. 1769.

† Dict. des Sciences Med. tom. lviii. p. 214.

Worms are said to prevail in the greatest degree amongst the poor, dirty, ill-fed classes of society, and particularly in persons who reside in damp marshy countries. According to M. Fortassin, the *tænia* is very frequently met with in butchers and others, who deal in new-killed animal substances. Persons who are in the habit of taking a good deal of wine, and other spirituous liquors, are remarked to be rarely afflicted with worms. Infants also, while they take no other food but their mother's milk, seldom have worms. These circumstances, having a close reference to the causes of worms, a subject that is yet very obscure, seem well-deserving of the reader's attention. At the same time, it must be observed, that these accounts are not so certain, as not to stand in need of farther confirmation.]

GEN. XI.
Helminthia.

The various kinds of worms traced in the human stomach and intestines have been differently arranged by different writers: but they have been chiefly assorted into *round* and *flat* worms; or into *indigenous* and *exotic*: in other words, into those which we are told are *generated* in the alvine channel, and those which enter it *from without*. The first method is too limited; and the second, as we have already seen, not only hypothetical, but built on a false basis; for we have reason to believe, that every species, found in this channel, primarily existed out of it. In unfolding, therefore, the subject farther, we shall employ a different arrangement, and comprehend, under the genus HELMINTHIA, three species of diseases, equally distinguished from each other by symptoms, and by the different tribes of animals which give rise to them; viz. those which are nourished and find a proper habitation throughout every part of the alvine canal; those whose proper habitation is limited to the extremity of the canal; and those which have no proper habitation in any part of it, and enter it erroneously or by accident.

Different arrangement of human worms by different writers;

but none sufficiently correct.

New arrangement proposed.

- | | |
|---------------------|----------------|
| 1. HELMINTHIA ALVI. | ALVINE WORMS. |
| 2. ————— PODICIS. | ANAL WORMS. |
| 3. ————— ERRATICA. | ERRATIC WORMS. |

SPECIES I. Helminthia Alvi.—Alvine Worms.

Worms existing and finding a proper nidus in the stomach or alvine canal, chiefly of children, and sickly adults; producing emaciation, a swelled hard belly, gnawing or pungent pain in the stomach, pale countenance, fetid breath, and irritation of the nostrils.

THE worms that chiefly infest this region, and produce these symptoms, may be arranged under the following varieties:

- | | |
|-------------------------|-------------------|
| α Ascaris lumbricoides. | Long round worm. |
| β Trichocephalus. | Long thread worm. |
| γ Tænia solium. | Long tape worm. |
| δ Tænia vulgaris. | Broad tape worm. |
| ε Fasciola. | Fluke. |

[So common are certain worms in the human subject, that, it

GEN. XI.
SPEC. I.

is calculated, one half of the total number of children have either the round, or thread-worm. *Tænia* is more rare, however; so that an estimate is made, that, in France, only one individual in a hundred suffers from it.* Worms are often only of one kind, and most frequently of the long round species; yet it is not very uncommon to find two species existing together in the alimentary canal. The records of medicine furnish examples of patients, who even voided simultaneously *ascarides*, *tæniæ*, and *lumbricoides*. Generally speaking, the smaller the worms, the more numerous they are; and the *tænia*, the largest, has received the epithet of *solium*, from the supposition, that it is always solitary, which was the notion of Hippocrates; but this point requires confirmation; for, in animals, and especially in the canine race, tape-worms exist together in great numbers.†

α H. Alvi.
Ascaris
lumbricoides.

The head of the LONG ROUND WORM is slightly incurved, with a transverse contraction beneath it; mouth triangular; body transparent, light yellow, with a faint line down the sides; gregarious and vivacious; from twelve to fifteen inches long. Inhabits principally the intestines of thin persons, generally about the ileum, but sometimes ascends into the stomach, and creeps out of the mouth and nostrils: occasionally travels to the rectum, and passes away at the anus. Frank notices an instance of eighty of these worms rolled up into a ball, and expelled during a fever: and gives another case, in which the whole intestinal canal, from the duodenum to the rectum, was crammed with them.‡

Habits and effects.

This animal will sometimes remain so quiet in its proper region, as to give no signs of its existence but by its discharge. Frequently, however, it is a troublesome and mischievous intruder, producing an intolerable feeling of faintness, great emaciation, and most of the symptoms enumerated under the specific definition. In its general appearance it bears so striking a resemblance to the earth-worm (*lumbricus terrestris*, Linn.), that by many naturalists it has been regarded as the same. Yet, to an attentive observer, there is a considerable difference both in their form and movements.‡ The body of the intestinal worm is round, its colour is a pale red, its head is furnished with three vesicles placed triangularly, and, in moving, it curls its body into circles, from which it extends its head. The earth worm is flat towards the tail, and has bristles on its under-side, which it can erect at pleasure. Its colour is dusky red; its head has but one vesicle, and it moves by a continuous course of action propagated from ring to ring.

How differs from the earth worm.

β H. Alvi.
Trichocephalus.

The body of the LONG THREAD WORM, is, above, slightly crenate; beneath, smooth; finely striate on the fore-part: head obtuse, and furnished with a slender retractile proboscis; tail or thinner part twice as long as the thicker, terminating in a fine hair-like point, about two inches long; in colour resembles

* Dict. des Sciences Med. tom. lvii. p. 215.

† De Cur. Morb. Hom.

Epit. tom. vi. lib. vi.

‡ See Baillie's Morbid Anatomy, and Hooper on Intestinal Worms, Mem. Lond. Med. Soc. vol. v.

the preceding; gregarious, and found chiefly in the intestines of sickly children; generally in the cæcum. It is found also in many animals besides man, as the horse, boar, fox, and mouse. Goeze considers the proboscis as the male organ.*

GEN. XI.

SPEC. I.

♂ H. Alvi.
Trichocephalus.

γ H. Alvi.

Tænia
solium.

In the LONG TAPE WORM the articulations are long and narrow, with marginal pores by which it attaches itself to the intestines, one on each joint, generally alternate; ovaries aborescent: head with a terminal mouth surrounded by two rows of radiate hooks or holders; and a little below, on the flattened surface, four tuberculate orifices or suckers, two on each side: tail terminated by a semicircular joint without any aperture: from thirty to forty feet long, and has been found sixty. Inhabits the intestines of mankind generally at the upper part, where it feeds on the chyle and juices already animalized. Is sometimes solitary, but commonly in considerable numbers; and adheres so firmly to the intestines, that it is removed with great difficulty. [It is seldom met with in France, where the broad tape-worm prevails; but it is common in Italy and Saxony.†] It is said to have a power of re-producing parts which have been broken off; but this assertion wants proof. The animal is oviparous, and discharges its numerous eggs from the apertures on the joints. Werner asserts, that it is hermaphrodite. The broken-off joints have, when discharged, the appearance of gourd-seeds: and it is hence denominated gourd-worm by many medical writers; and is the *lumbricus cucurbitinus* of Dr. Heberden. In the collections of the Medical Society of Copenhagen, Dr. Sibbarngaard gives the case of an adult female patient, who was infested with a tape-worm of enormous length, measuring not less than thirty-eight yards, or one hundred and fourteen feet. It was expelled from the anus after taking three doses of a bolus, consisting of two drachms of tin filings and half a drachm of jalap mixt up with honey.‡

Genuine
character.

The articulations of the BROAD TAPE-WORM are short and broad, with a pore in the centre of each joint, and stellate ovaries round them: body broader in the middle, and tapering towards both ends; head resembling the last, but narrower and smaller; tail ending in a rounded joint. Like the last, inhabits the upper part of the intestines, and feeds upon the chyle; from three to fifteen feet long; usually in families of three or four.

♂ H. Alvi.
Tænia vulgaris.

The body of the FLUKE is flattish, with an aperture or pore at the head, and generally another beneath; intestines flexuous; ovaries lateral: hermaphrodite, and oviparous.§

♂ H. Alvi.
Fasciola.

Of all intestinal worms, this is one of the most common to

Found extensively in almost all animals.

* Naturgeschichte der Eingeweidewürmer. Blankenb. 1782.

† Merat, in Dict. des Sciences Med. tom. lxxvii. p. 227.

‡ Societatis Medicæ Havniensis Collect. vol. ii. 8vo.

§ C. A. Rudolphi's works, entitled, Entozoorum, sive Vermium Intestinalium Historia Naturalis, Amst. 1803; and Entozoorum Synopsis, Berol. 1819; should be consulted by all who desire the most correct description of intestinal worms. Nor should the writings of Bloch, Goeze, Zeder, Werner, Hermann, Fischer, Brera, Hooper, Lamarek, Dumeril, Cuvier, Blumenbach, and Laennec, be forgotten. Ed.

GEN. XI.
SPEC. I.
H. Alvi.
Fasciola.

Cause of
effects of the
rot in sheep.

Most prob-
ably the
latter;
and the rot
produced by
a floating
miasm.

Fluke found
in other
diseases
than the
rot.

View of the
treatment
postponed
till the
remaining
species
have been
noticed.

animals of different classes. It is sometimes, though rarely, found in man;* but in different species, or under different modifications, we meet with it very frequently and very abundantly in quadrupeds of almost all kinds, reptiles, fishes, and even in worms themselves of a larger growth, for it is occasionally met with in the intestines of the cuttle-fish. Its ordinary seat is in the stomach or alvine channel; but in swine, black-cattle, deer, and sheep, its favourite haunt is the liver, to which it probably creeps forward through the bile-ducts, and where it burrows and breeds in innumerable hosts. This is particularly the case with the *fasciola hepatica*, as it is called by way of emphasis, found so commonly and so abundantly in the liver of sheep that labour under the disease called the rot; though whether it be the cause or the effect of this disease, has not yet been ascertained. Most probably the effect: for the rot is certainly an infectious complaint, and is sometimes caught by a whole flock in a single night. The cause has been supposed to be hydrogenuous gas; but of this we have no proof. There can be little doubt, however, that it is produced by some deleterious miasm in the atmosphere originating in the pasture itself, or conveyed there in the form of a haze, in the same manner as vegetable plantations are often blighted, of which I have just offered an example from hop-grounds. Yet by what means the liver of sheep, rather than any other organ, is hereby affected and rendered gangrenous, we have still to inform ourselves. As the animal is oviparous, the minute eggs may be borne by the haze itself, or exist in the stagnant atmosphere of the sheep-ground; or they may already, in the body of the parent-worm, be infesting the alimentary canal, and only waiting for accidental circumstances to exert the full range of their prolific powers; for it is not in the rot alone, but in other cases of visceral diseases, that this animal is traced in sheep, and especially in dropsy, whether connected with the rot or not; and, in both diseases, they are frequently found vomited up in brooks.

As the treatment of all the species should be established on the same principle—that of invigorating the alimentary canal and surrounding viscera,—and the vermicifuges adapted to many of the different tribes, though not to all, are the same, it will be better to reserve this subject till the nosological characters of the remaining species have passed in review before us.

SPECIES II. Helminthia Podicis.—Anal Worms.

Worms, or the larvæ of insects, existing and finding a proper nidus within the verge of the anus, exciting a troublesome local irritation, sometimes accompanied with tumour; frequently preventing sleep, and producing pain or faintness in the stomach.

UNDER this species are included the following varieties:

* Docver, Verm. p. 54. Clerk, Lumbric. p. 119.

α *Ascaris vermicularis*.

Thread-worm.

GEN. XI.

β ——— *Scarabæus*.

Maw-worm.

SPEC. II.

γ ——— *Æstrus*.

Beetle grubs.

Bots.

The head of the THREAD-WORM is subulate, nodose, and divided into three vesicles, in the middle of each of which is an aperture by which it receives nourishment; skin at the sides of the body finely crenate or wrinkled; tail finely tapering and terminating in a point; the female has a small punctiform aperture a little below the head, through which it receives nourishment: gregarious: viviparous; about half an inch long; sometimes wanders into the intestines, and occasionally as high as the stomach. It was first observed by Morgagni.*

α *H. Podicis*.
Ascaris vermicularis.

The sexes of this variety are distinct, but the male organs have not been discovered. The form of intestinal worms was first detected by Hippocrates.† Goeze conceives it to be viviparous, but Bremser oviparous‡ It is the *oxyuris vermicularis* of the latter. The animals are of a yellowish white colour, and have a general resemblance to the *ends of threads* cut off, and about half an inch in length, whence the name of THREAD-WORMS, and probably of BOTS, which is often, but erroneously, applied to it, and which I suppose to be a corruption of the French *bouts*, “ends” or “extremities.” The term MAW-WORM, according to Dr. Harvey, is derived from the occasional visit which this animal makes to the maw or stomach in migrating from its proper region, which is the rectum;§ but, more probably, from the peculiar effects which it often produces on the maw or stomach by sympathy, and without quitting its home, as a perpetual and gnawing pain and insupportable faintness from the intolerable itching it excites in the anus. Sometimes these worms wander in a different direction, for they have been found in the pudenda: and by Frank in the urethra and the urine.|| Very generally, however, they remain quiet and inactive, convoluted in mucus and feces, and are only known to exist by their discharge. Yet occasionally they produce so much irritation as to cause a sensible tumour, or a congeries of small tumours around the anus. They sometimes co-exist with other kinds. Rosenstein gives the case of a child, who, in conjunction with a large number of ascarides, voided ten long worms and a piece of a tænia. The little patient died screaming under the most excruciating pain and convulsions.

Oxyuris vermicularis of Bremser.

Why called thread worm.

Why called maw-worm.

Sometimes travel to the pudenda.

Sometimes excite tumours in the anus. Sometimes co-exists with other kinds.

The larvæ of the second variety embrace several species of the SCARABÆUS or BETTER,¶ which have not hitherto been accurately described or enumerated; but of which the following seem to be the chief: gray larva, with yellowish legs and ferruginous head, of *s. nobilis*; and those of *s. Schœfferi* and *s. volvens*, which, when out of the body, deposite their eggs in round balls of animal dung, which they roll up and bury with

β *H. Podicis*.
A-caris
Æstrus.

* Lib. xiv. 42. † Aphor. iii. ‡ Ueber Lebende Würmer, 4to. 1819.

§ On Conspicuous. || De Cur. Hom. Morb. Epit. tom. vi. lib. vi.

¶ Paulini Cent. iv. Obs. 8. Timæus, Cas. p. 120.

GEN. XI.
SPEC. II.
γ H. Podi-
cis.
Ascaris
Cæstrus.

their hind feet. Almost all the grubs of the genus *Scarabæus* delight in, and feed on dung; and hence the eggs find a convenient nidus and the grubs a ready supply of food in the rectum, when accident has conveyed the former into this organ. These grubs have six feet; are annulate, hairy, vesicular at the end of the abdomen, and furnished with a horny head.

The larvæ of the CÆSTRUS, BREEZE, or GAD-FLY, are called bots, and are of a round figure; pale-green; tail obtusely truncate; head tapering; mouth horny, with two lips, and two recurved black claws on each side of the mouth. Found convoluted in the mucus and feces of man, but far more frequently of other animals, and especially of the horse.

Eggs chiefly deposited on the skin of animals.

The genus *cæstrus* is not numerous, containing in all not more than twelve species. Of these the greater number deposite their eggs on the skin of animals, and are there hatched. The *cæstris ovis* fixes them on the interior nostrils of the sheep; from which, when hatched, they travel into the frontal sinuses or horns, and, when full fed, are discharged through the nostrils. They excite great irritation, often compelling the sheep to shake their heads violently, and rub or hide their noses in dust or gravel, and sometimes produce inflammation in the brain.

How conveyed from hence into the intestines.

There are only three species, however, whose larvæ seem capable of being hatched in the intestinal canal. These are *cæstrus equi*, *æ. hæmorrhoidalis*, and *æ. veterinus*. The eggs of the last are found deposited on the skin of cattle in general, and those of all on the skin of the horse; the part of the horse preferred by hemorrhoidal breeze, being the lips. The eggs excite a troublesome titillation, which induces the animal to bite the part and lick it with its tongue, in consequence of which the eggs are transferred from the skin to the tongue itself, and find a ready conveyance to the rectum, which is their proper nidus.

The variety found chiefly in the intestines of grooms and horse-dealers, and constitutes proper bots.

It is the hemorrhoidal breeze, whose eggs are chiefly, if not solely, hatched in the human intestines, and especially those of grooms and other persons, whose duty leads them to associate much with horses, and other large domesticated quadrupeds. And it is the grubs or larvæ of this genus, when discharged from the anus, that constitute the proper *Bots* of veterinary writers, though the term is often misapplied to the *ascaris vermicularis*, as observed already, to which, indeed, they have some resemblance.

Mr. Greenhaw has described a very copious discharge of transparent globular materials from the rectum of a boy of nine years of age, which he thinks were hydatids.* [They were of the size, and many of them of the colour of gooseberries. The editor was very lately consulted by Mr. Smith, of Tottenham-court-road, about a patient, who occasionally voids from the rectum a yellowish fluid, containing small globular bodies resembling hydatids. The patient's chief distress seems to depend, however, upon irritation of the bladder, the cause of

* Edinb. Med. and Surg. Journ. No. lxxvii. p. 574.

which is not very apparent, as he has neither stricture nor stone. GEN. XI.
Within the rectum are a few hemorrhoids, but not of considerable size.] SPEC. II.

SPECIES III. Helminthia Erratica.—*Erratic Worms.*

Worms, or the larvæ of insects, introduced by accident, and without finding a proper habitation in the stomach or intestines; producing spasmodic colic with severe gripings; and occasionally vomiting or dejection of blood.

OF this subdivision we know but little; yet the ensuing instances may afford sufficient reason for forming it. It might easily be enlarged; but the authorities for extending it farther are doubtful.

α Gordius.

Hair-worm.

β Hirudo.

Erratic leech.

γ Musca.

Maggots.

The GORDIUS is the seta equina, or horse-hair-worm, of the old writers. It is found in soft stagnant waters; from four to six inches long, twisted into various knots and contortions; colour, pale brown, with dark extremities. α H. erratica. Gordius.

This disease is most frequent among the peasants of Lapland, and was suspected by Linnæus, and has been since proved, or thought to be proved, by Dr. Montin, one of his most celebrated disciples, to be occasioned by their drinking the half-putrid water of stagnant marshes or ditches inhabited by the gordius. It is not known on the Lapland mountains. The gripings are often so violent that the patient rolls and writhes on the ground in severer agony than a woman in labour, and discharges bloody urine. After many hours, sometimes an entire day, the disorder terminates in a profuse ptyalism, that continues for a quarter of an hour. The Laplanders call the disease *Ullen*, or *Hotme*.*

The SECOND VARIETY includes several species of the LEECH, β H. erratica. Hirudo. swallowed, when minute and young, along with the muddy and stagnant water they inhabit.

Apparently both the medicinal and the horse-leech (*h. sanguisuga*) have been thus found; but the exact species has not been sufficiently indicated. Sauvages, in his genus *Hæmatis*, quotes Galen, Schenck, and Wedel, but does not describe the species. Upon turning to Galen, iv. 411. D. the reader will find that he briefly adverts to the disease, and quotes from Asclepiades and Apollonius the remedies that were employed in their respective days; but he does not characterise the worm.

Of helminthia, from this cause, we have numerous examples in foreign writers and journals;† but we need not travel from

Wonderfully changed from their common forms when in the intestines.

* Linn. Flor. Lap. de Angelica. Montin, Amœn. Acad. Splachnum, ii. 26.

† Eph. Nat. Cur. Cent. vii. Obs. 25.—Rhodius, Cent. ii. Obs. 72.—Blanchard, Collect. Med. Phys. Cent. i.

GEN. XI.
SPEC. III.
 β H. er-
ralica.
Hirudo.

our own country for instances. Of domestic examples, several are related in the comment to the volume of Nosology; and, though apparently well attested, are of a truly marvellous character. The fact appears to be, that, from fixing on the internal tunic of the stomach, or intestines, these worms riot on so rich and plentiful a repast, that they grow to an enormous size, and evince such a deviation from their common shape, as in some instances to be recognised with great difficulty. It is highly probable, however, that they can only live in dyspeptic patients, or persons whose digestive powers are infirm: for there are few or no animals capable of resisting the solvent power of the gastric juice when secreted in full health and vigour.

One of the most extraordinary instances among those entitled to attention, is related by Mr. Paisley in the *Edinburgh Medical Essays*.* In this case, there were two worms, whose heads the author compares to that of the horse-leech, and which appear to have been tolerably quiescent in their growth, till the general system was disturbed by a wound on the breast received by the patient in consequence of a duel with the small sword. The general symptoms of this species of helminthia appeared about the third day afterwards, and continued with many variations for several weeks, when the patient discharged inferiorly one of these worms, measuring a foot and a half in length, and an inch and a half in diameter, dead, but full of blood, and accompanied by a large dejection of grumous blood, "to appearance some pounds;" and not many weeks afterwards, the other still larger. A worm, apparently similar, is stated by Dr. Bond of Philadelphia, in 1754, to have been discharged downwards, by a female patient of his, who had been long subject to an hepatic disease, which gradually changed to violent helminthic symptoms in the stomach. These, at length, suddenly vanished, and within twenty-four hours the worm was dejected, dead, and in two parts, the whole making twenty inches in length. The patient died soon after; and on opening her, this worm appears to have worked its way, when small, into the liver, by the course of the common duct, to have committed great depredation here, and afterwards, with considerable difficulty and dilation of the duct, to have travelled back again. Dr. Bond ventures to call it an *hepatic leech*: though he calculates its course as now stated.†

[In Egypt, the French soldiers, urged by severe thirst, frequently drank the muddy water of lakes and pools; an opportunity was thus given for the insinuation of leeches into their nostrils, and even into their stomach. The same annoyance likewise befel the soldiers of the same nation at Fort Mahon, in 1757. In one of the latter cases, the patient, after having vomited up three pints of blood, requested of his own accord the proper remedy, namely some vinegar; and as soon as this had been taken, the leeches were rejected. According to Lar-

* Vol. ii. art. xxvi.

† London Med. Observ. and Inq. i. 68.

rey, the removal of these animals from the nostrils, when they cannot be laid hold of with forceps, is most effectually accomplished by means of a lotion, composed of nitre and diluted vinegar.* The long continuance of the leeches generally produced much indisposition, a loss of flesh, and sometimes delirium.]

GEN. XI.
SPEC. III.
β H. erratica.
Hirudo.

The THIRD VARIETY consists of the grubs of different species of that subdivision of the genus MUSCA, or FLY, whose sucker is possessed of a single bristle without a sheath, and short; clavate, furnished with a lateral hair. These deposite their eggs in game and other meats that have been long kept, and are approaching a putrid state, as *musca carnaria*, or flesh-fly; *m. vomitoria*, or blow-fly; *m. cibaria*, or pantry-fly; or perforate and lay their eggs in cheese, bacon, hams, or other salted and high-tasted viands, as, *m. putris*, the larvæ of which are known to the housewife by the name of *hoppers*, as those of all of them are by that of *maggots*; which last has often, though in a looser sense, been applied to the grubs of insects generally.

γ H. erratica.
Musca.
Eggs, where deposited.

Hoppers.

From the deposite of the eggs of these species of the fly in so many branches of the common food of man, there is no difficulty in conceiving how they may pass into the human intestines. In a sound state of the stomach, indeed, we have little reason to believe, that they could be hatched and live in that organ; but they may find a convenient nidus, and live comfortably in a debilitated stomach, and apparently through the entire range of the intestinal canal.

How reach the animal intestines.

The cases of this affection are numerous. One of the best related, is that of Dr. White in the Memoirs of the Medical Society of London. The patient, aged thirty, was emaciated, of a sallow complexion; had gripings and tenderness of the abdomen; costiveness, rigors, and cold extremities. Took columbo root, and occasionally calomel and other purgatives. In a month was better, and the appetite good. The next purgative brought away an immense number of pupes or chrysalid worms; some of which being preserved, were transformed into the *musca cibaria*.

Examples.

We have also examples of the larvæ of other insects that have entered the stomach by some accident or another. Thus, Mr. Church, to whose entomological skill Dr. White confided the examination of the above paper, asserts, that he once knew a child discharge a larva of the caddy insect (*phryganca grandis*;) and that the *phalena pinguinalis* lives and is nourished in the stomach; and after sustaining several metamorphoses, is thrown out, and proves its proper genus.† Mr. Calderwood has published a like case;‡ Riedlin, examples of other fly-maggots;§ other writers, of the larvæ of the beetle, or the bee discharged by the anus after violent gripings;|| while Planchon describes a live spider thrown forth from the same opening.¶

Bee lodged in the intestines.

Spider.

* Mem. de Chirurgie Militaire, tom. i. p. 362.

† Vol. ii.

‡ Edin. Med. Com. ix. 223.

§ Cent. iii. Obs. 85.

|| Obs. Med. Cur. de excretionem vermis nunquam ante excret. Wolfenb.

1723.

¶ Journ. de Méd. iv. p. 203.

GEN. XI.
SPEC. III.

γ H. er-
atica.
Musca.

Triton
palustris.

Lacerta
aquatica.

Singular
example of
a general
repository
in the
stomach of
insects and
other
parasites.

Weikard gives an instance of a *triton palustris* discharged by vomiting;* and many of the continental writers have examples of rejection by the same passage of the *lacerta aquatica*, unquestionably swallowed when minute and unperceived, with the water obtained from ponds and lakes.† In one instance not fewer than five of these were thrown back at a time.‡

But of all such marvels, the most extraordinary, and one of the best attested, is that narrated by Dr. Pickells;§ consisting of enormous progenies of apterous, dipterous, and coleopterous insects, discharged both by the mouth and anus. The patient was a young woman, who had long been in a melancholy frame of mind from the loss of a beloved mother, and who, under a superstitious idea, that a certain portion of clay drunk daily, from the graves of pious clergymen, would preserve her from disease as well as from sin, contrived to stock her chamber with a large quantity of this material from the graves of two clergymen whom she had known, and which appears to have formed a bed for the eggs of the insects thus hatched in the stomach. "Of the larvæ of the beetle," says Dr. Pickells, "I am sure I considerably underrate when I say that, independently of above a hundred evacuated per anum, not less than seven hundred have been thrown up from the stomach at different times since the commencement of my attendance. A great proportion were destroyed from an anxiety to evade publicity; many, too, escaped immediately after having been vomited, by extricating themselves quickly from the vessel, and running into holes in the floor. Upwards of ninety were submitted to Dr. Thompson's examination, nearly all of which, including two of the specimens of *tenebrio molitor*, (*darkling*), I saw myself, thrown up at different times. The average size was about an inch and a half in length, and four lines and a half in girth. The larvæ of the dipterous insect, though voided only about seven or eight times, according to her account, came up almost literally in myriads. They were alive and moving." [In an interesting appendix|| to the preceding account, Dr. Pickells states, that under a persevering use of common turpentine, in doses, gradually increased to the enormous one of six ounces, the larvæ of the beetle, which were the principal source of annoyance, had been destroyed, and that the patient now enjoys almost total immunity from her long protracted and complicated diseases. In the course of a year and a half, subsequent to his former communication, she had voided more than 1300 additional beetle larvæ, principally from the anus, making in the whole nearly 2000 seen by Dr. Pickells, besides many others which he did not see. Besides the beetle larvæ, dipterous ones continued to be voided at intervals during

* Vermischte Schrifter, iv. p. 127. Kl. Schrift. p. 82. † Journ. de Médecine, tom. ix. p. 447.—Schwarz, Med. Wockenblatt. 1780. No. 27.

‡ Observ. Méd. Cur. de excretionem vermis, etc. ut suprâ. Wolfenb. 1723.

§ Trans. of the Association of the Fellows and Licentiates of the King and Queen's College of Physicians in Ireland, vol. iv. art. vii. 8vo. 1824.

|| Op. cit. vol. v. p. 171, &c. 8vo. 1828.

the same period, both from the stomach and the rectum; sometimes without medicine, but more frequently by the effect of castor oil, strong doses of turpentine not killing them. Ascarides, resembling the ascarides felis, were also discharged upwards and downwards, as well as numerous larvæ of blaps. Whence the constant supply of the latter was derived, is a very puzzling question in the history of this extraordinary case; for, if they propagate only in the imago, or perfect state, as is asserted, their generation within the body can hardly be supposed, as only two insects far advanced, one an imago, the other a pupa, were known to be discharged, and yet larvæ of every gradation continued to be voided to the last. Her food and drink were from the same source as those taken by other healthy persons; and she lived on an upper floor where the kind of beetles, which she voided, are not usually found.]

GEN. XI.
SPEC. III.
γ H. er-
ratica.
Musca.

Many of the larvæ or insects thus thrown up, had been preserved alive in clay or pill-boxes, for upwards of a twelvemonth at the time of writing. Pain in the stomach, suppression of the menses, irritation of the bladder, hæmatemesis, occasional perversion of all the external senses, vertigo, convulsions, catalepsy, mania, delirium, and various other affections of the nervous system, indicative of helminthic irritation, were the sad train of evils that alternately overpowered the patient. [The quantity of blood thrown up from the stomach, in the course of the case, was such as to create surprise that she should have been able to bear the loss. A retention of urine, with which she was long afflicted, was completely removed after a dose of five ounces of turpentine, a great deal of blood at first coming away with the urine. The same medicine also evinced great power in restoring the catamenia.]

To all these parasitic vermicles will apply the remark I have already made upon a single variety; that they appear, from the luxuriance of their haunts and repasts, to be in various instances peculiarly enlarged, and altered from the structure they exhibit out of the body:* whence the great difficulty of determining in many cases the exact external species to which a larva, worm, or animalcula found within the animal body may belong. Yet of all the erratic worms and grubs, the horse-leech, *hirudo sanguisuga*, appears to undergo the greatest metamorphosis; and, as observed in the comment to the Nosology, is reported in one instance to have reached the size of a man's fist, and to have contained a pound and a half of blood.

From their altered forms, great difficulty in determining their exact species.

In the leech and horse-leech especially.

GENERAL DIAGNOSIS AND TREATMENT.

We have had occasion to observe, that the stomach is the great organ of sympathy, and associates in affections of the most remote parts of the system. It follows necessarily that other parts of the system must, in various instances, associate in affections of the stomach. This is particularly the case with respect to the irritation produced by worms, and especially

Diagnosis.

* Bremser, Ueber lebende Würmer in lebenden Menschen.

GEN. XI. those that exist in the stomach itself, or the upper part of the
SPEC. III. alvine canal, as lying nearest to it.

Helminthia. "The evils* which hence arise," says Dr. Heberden, who
As describ- has well drawn up the general train of symptoms, "and which
ed by He- cease on their expulsion, are head-aches, vertigo, torpor, dis-
berden. turbed dreams, sleep broken off by fright, and screaming, con-
vulsions, feverishness, thirst, pallid hue, bad taste in the mouth,
offensive breath, cough, difficult breathing, itching of the nos-
trils, pains in the stomach, nausea, squeamishness, voracity,
leanness, tenesmus, itching at the anus towards night, at length
dejection of films and mucus. The broad tapeworms produce
the severest mischiefs on the body; the teretes and ascarides
(round and thread-worms) sometimes lurk scarcely suspected,
unless there is itching of the anus, or they are traced in the
feces. I have seen a broad tape-worm expelled from the intes-
tines four ells in length. The long tape-worm (*lumbricus cur-
cubitinus*) seems to be a series of many worms, a single joint of
which will sometimes live when separated from the rest. The
round worms have ascended into the mouth, and have even liv-
ed two or three days after they have been discharged. In two
patients, under my care, there was room for suspecting, that the
gourd-worm had induced epileptic fits, mania, and idiotism."

Remarks on
Heberden's
description.

Upon this passage it is only necessary to observe, that the
long tape-worm, *tania solium*, or, as Dr. Heberden calls it, *lum-
bricus cucurbitinus*, is not a series of many worms, as this elegant
writer suspected, and as, indeed, is generally suspected at pre-
sent; and although its different joints, when separated from the
rest, are capable of maintaining for a short time an independent
life, they neither continue alive long, nor are competent to pro-
duce any increase. They have, however, been sometimes
found alive at the time of expulsion.

Other mis-
chievous
effects.

There are other mischievous effects than Dr. Heberden has
here pointed out occasionally to be traced in remote organs,
from the sympathetic action of worms lodged in the intestines.
Thus the lungs, as well as the brain, have frequently been
found to participate in the disease, and at times the uterus; and
a profuse hemorrhage has ensued from the one or the other or-
gan, and very frequently from the nostrils, and been repeated at
uncertain intervals, in some instances without any suspicion of
the real cause, and consequently with an erroneous practice.
Mr. Rumsey, of Beaconsfield, has published an instructive paper
upon this subject,† in which various cases of sympathetic he-
morrhage and pulmonary affection seem to have been relieved
by an anthelmintic course.

Worms to
be suspected
in obscure
cases.

"In all obscure diseases," says Dr. Swediaur, "attended with
symptoms that are chiefly anomalous, the suspicion of the phy-
sician should be directed to intestinal worms. I once knew a
case, in which the patient, who was miserably afflicted with
pains in various joints of the body, simulating those of arthrody-

* Mala, quæ ex his oriuntur, quæque his expulsiis finiuntur, sunt dolores
capitis, vertigo, torpor, somnia, &c. Cap. lix. p. 243.

† Transact. of the Medico-Chir. Soc. vol. ix.

nia, by taking an anthelmintic, and discharging in consequence hereof, various fragments of a tænia with a mass of mucus, became perfectly well. So," continues he, "have I known apoplexy and palsy removed by a discharge of worms from the intestines: and had once a patient remarkable for a filthy and fungous excrescence on the nose; who lost the excrescence spontaneously after a successful course of vermifuges."*

GEN. XI.
SPEC. III.
Helminthia.

[Intestinal worms are sometimes so numerous, that they occasion death. This is not uncommon in children from the effect of lumbrici;† and happens even to adults whose bowels contain tænia of extraordinary size.]

Sometimes fatal.

There is yet great space for improvement in the mode of treating this complaint. The larger worms unquestionably are found most frequently in young persons, or persons of weakly and inelastic fibres, and dysthetic habits; and hence our first intention should be to invigorate the system generally, and the stomach and intestines particularly, by bitter and other tonic medicines; for it is not often that they resist a very strong living action. And yet I have sometimes found the long round worm in persons, who have made no complaint of ill health, of regular habits, and in the middle of life. [When the editor of this work had charge of the Military Hospital at Canterbury, many recruits, in the prime of life, strong and healthy, were attacked with typhus and other fevers, in the course of which, the discharge of lumbricoid worms of considerable size was not an uncommon circumstance. His reflections lead him to doubt the soundness of the theory, which ascribes the origin of worms either to weakness of the whole system, or to that of the digestive organs. An effect seems here to have been mistaken for the cause.] Worms have occasionally infested the alvine channel for years without any serious evil—the ascarides, indeed, as Dr. Heberden informs us, for thirty years, or for even the whole of a long life, without any reason to suspect, that they had hastened its end;‡ whence some writers have been fanciful enough to conceive, that, in animals of most genera, they form a mean of maintaining the general health, and are a regular part of the economy of perfect life. [The celebrated Dr. Rush conceived, that they might sometimes promote health, by diminishing the quantity of redundant mucus in the intestinal canal.] "Worms," says Dr. Parr, "seem to form part of a healthy constitution, and are scarcely injurious but from accidental circumstances." This quaint though common paradox, however, is somewhat shaken by the doctrine contained in the next paragraph; in which a very unnecessary and untenable distinction is drawn between the law which in this respect regulates animals and vegetables; and followed up by a remark at variance not only with general observation, but with the import of Dr. Parr's own reasoning upon the subject. "This

Weakly habits found most usually a nidus;

but not always.

Sometimes they infest through the whole term of life.

By some erroneously supposed to contribute to health.

Such the opinion of Dr. Parr.

But at variance with other opinions of his expressed elsewhere.

* Nov. Nosol. Meth. Syst. vol. ii. p. 245.

† See two cases in Corvisart's Journ. de Méd. tom. xii. p. 3.

‡ Transact. of the College of Phys. of London, vol. i. p. 54.

GEN. XI.
SPEC. III.
Helminthia.

circumstance," says Dr. Parr, "forms a striking distinction between animals and plants. Parasitic animals attack only debilitated plants: but the healthiest animals are chiefly affected with worms; and the observations, which seem to contradict this, arise from a neglect of the distinction between the existence of worms and their *appearing* a source of disease from their *accumulation*. Their formation is assisted by accumulations of mucus; and, consequently, in children, sometimes in cachectic patients, they become *inconvenient*."

Inconvenient is a somewhat gentle term for expressing the fearful host of effects which we have just enumerated from Dr. Heberden, and which Dr. Parr himself has in other places arrayed in form and number quite as appalling. But if this *inconvenience* be mostly promoted by an accumulation of mucus, and if children and cachectic patients be mostly exposed to such accumulation; these worms do not seem, properly speaking, to form part of a healthy, but rather of a weakly constitution; nor can the healthiest be said to be chiefly affected by worms. And the same general law applies equally to animal and vegetable life. In both, the most imbecile are the most affected; and the strongest, when affected, are the least injured, for the very reason that they are the strongest.

Parasites
found chiefly
in weakly
plants as
well as
animals.
Illustrated
from the
existence of
flukes in
sheep la-
bouring un-
der the rot.

The disease called *rot*, in sheep, to which I have already alluded, is a farther illustration of this remark. Here the fasciola, or fluke, makes its appearance in prodigious numbers in the liver of the animal, which is sometimes entirely preyed upon and destroyed. Though there is some doubt among physiologists whether this worm be the cause or the effect of the disease, all are agreed, that the malady never appears in a wholesome atmosphere, and a strong and vigorous state of health: and it has of late been sufficiently ascertained, that tonic stimulants, and especially the stimulant property of sea-salt, whether mixed with the food mechanically or chemically, as in salt marshes, is the best and most effectual mode of cure. The food of merinos, in Spain, is therefore constantly enriched with salt; and Lord Somerville justly attributes the health of his flock, of upwards of two hundred merinos, which he purchased in Spain, to the use, which he has for years made of this article on his farm. A ton of salt is the proportion employed annually for every hundred sheep.

And their
mode of
cure.

Treatment.
Hence the
system to be
strengthened
generally:
and then anthel-
mintics.
Or both
used simulta-
neously.

One mean, therefore, and perhaps the most powerful in our possession, of getting rid of intestinal worms, is that of strengthening the system generally, and the alvine canal particularly. Our next mean is the use of what have been called anthelmintic medicines, or those which either destroy worms, or drive them from the body by qualities which torment or distress them. Both these intentions may sometimes be pursued simultaneously; and where they cannot, from the weakness of the patient, we should commence with the former. A decisive vermifuge process is yet a desideratum in medical practice: for, first, worms lie for the most part so low in the intestines, or are so completely involved in viscid mucus or other slime, that oil of

Worms de-
stroyed with
difficulty in
the body,
and why.

turpentine, tobacco-water, and mercurials, which readily enough destroy them out of the body, seldom go directly home to them when within it; and next, most of the medicines that promise to produce this effect have a tendency at the same time to weaken the action of the stomach and intestines, and consequently to render them a fitter habitation for such unwelcome tenants.

GEN. XI.
SPEC. III.
Helminthia.

“So that,” says Dr. Heberden, “till some more certain remedy shall be discovered, nothing will be more serviceable than to keep the bowels loose, during which they may be easily submitted to, and by degrees may be safely evacuated.”

Vermifuges
apt to
weaken the
action of the
stomach.

By their irritation they augment the secretion of mucus, in which also they involve themselves. Brera says they feed upon it, and if deprived of it they die;* and adds that the painful itching is chiefly owing to a want of mucus in the inner surface of the intestines. But this is altogether inconsistent with common facts, which sufficiently prove, that there is usually, if not always, an excess of slime or mucus.

By keeping the bowels loose, we prevent the accumulation of this slimy material in which the worms burrow: and if we have reason to believe, that such accumulation has taken place, the best plan is to give active purges, as calomel, jalap, scammony, gamboge, or an intermixture of these, for its removal: and having thus, as far as we are able, exposed the naked bodies of the worms to the action of ANTHELMINTICS, we should proceed with the latter without loss of time.

Aperients
necessary at
first, and
why.

Afterwards
anthelmin-
tics.
The list of
these very
numerous.

The list of these is almost innumerable; and the very length of the catalogue serves to show us how little we can place a positive dependence, even at the present hour, upon any one of them as a specific.

Anthelmintics may be conveniently divided into two classes. Firstly, those that dislodge and drive away intestinal worms by some mechanical or other external action; and, secondly, those that destroy them by some narcotic or other internal means.

Divided into
two classes.

In the former we may rank all the drastic cathartics; all the oleaginous vermifuges, as oil of olives, beech-nuts, castor, and turpentine; sulphur, petroleum, and sea-salt; tin-filings; crude quicksilver, or Plenck's gray mucilage of it; the lunar pill of Boerhaave, formed from a preparation of silver, which may be regarded as a mild lunar caustic; and the bristly down of the pods of cowhage. In the latter we may place the male-fern, hellebore, fetid hellebore, cevadilla, tansy, savine, rue, dittany, tobacco, worm-seed (*artemisia santonica*, Linn.), bark of the bulge-water tree (*Geoffroya inermis*), and of the cabbage tree (*areca oleracea*); the *spigelia*, and *scabiosa Indica*.

First class
operating by
chemical or
external
action.

Second class
operating by
a narcotic or
other internal
power.

Simple purgatives, even the most active and drastic, seem to have little other effect than that of clearing away the mucous and other viscid materials, in which most of the intestinal worms are fond of burrowing, and thus exposing their naked and tender bodies to the action of other and more direct anthel-

Purgative
anthelmin-
tics.

How far
useful.

* Lezioni sui Principali Vermi del Corpo umano, 4to. Crema, 1801.

GEN. XI.
SPEC. III.
Helminthia.

mintics. Even colocynth, which unites a bitter principle to a cathartic power, and which on this account was for ages regarded as an anthelmintic doubly armed for the field, is now well known to be incapable of poisoning them—as Redi has exposed various kinds of them to a strong decoction of this medicine for four-and-twenty hours without serious mischief.

It is, nevertheless, obvious that these medicines have their use, and are in fact of very great importance; and especially in the case of children, whose bowels are more easily loaded with mucus than those of adults, and who, on this account, bear active purgatives with much less inconvenience. In an attack upon worms, brisk cathartics should always take the lead. They ought not, however, to be too frequently repeated, nor continued through a long series; as in this case, they will rather augment, than diminish, the mucus by their own irritation.

Oleaginous
anthelmin-
tics.

How far
useful;

and against
what worms
chiefly.

Upon the oleaginous vermifuges we can place but little dependence, if we except the terebinthines. Olive and castor oil may be of slight subsidiary benefit, by mixing with the surrounding slime and removing it by what purgative power they possess; but their chief benefit, if they be serviceable at all, is probably in greasing the bodies of the worms, and blocking up their stigmata or respiratory pores: in which view, they are better adapted for the cure of worms that infest the stomach and upper intestines, where they can exert their power at once, and without dilution or chemical change, than for those that take up their habitation lower; and especially for the cure of the long round and the long thread-worms, as these are killed more readily than the tape-worms, which often only perish by separate joints. For the cure of vermicular ascarides, or maw-worms and bots, these oils have been used in the form of injections: but we have no decided proofs of any great benefit that has been derived from their use in either way, in respect to the worms, for which, indeed, they are rarely to be recommended, though they are often useful in taking off the irritation of the mucous membrane itself.

Terebinthi-
nate oils.

How far
serviceable.

The terebinthinate oils are far better entitled to our attention, and appear to act as purgatives upon the bowels, and as external irritants upon the worms exposed to them. The vermicular ascaris rarely resists their use when given in a dose sufficiently large to reach the rectum, or when injected into this organ; and has been discharged in great abundance. The alvine worms, if not equally affected, are nearly so; even the tæniae have yielded to their acrimony.* The rectified oil of turpentine is that in common employment. [Convincing proofs of its efficacy in cases of tænia were published by Dr. Fenwick,† of Durham, to whom the merit of its first administration has been erroneously referred, not only by the author of this work, but other distinguished men.‡ Turpentine was recommended for its anthelmintic virtues even by Bartholine;§ and Chabert's

* Diseases of Tropical Countries. By C. Chisholm, M.D. p. 99. Lond. 8vo. 1822. † Med. Chir. Trans. vol. ii. ‡ See Gregory's Elem. of Physic, p. 521, 2d edit. § Epist. iv. p. 345.

celebrated remedy consisted principally of it.]* Turpentine is usually given in doses of from half a drachm to a tea-spoonful to an infant, and from an ounce to an ounce and a half to adults, alone, or with a little peppermint or cinnamon water; though for infants the best medium is milk. These doses, however, may be considerably increased, and will in many obstinate cases be found inefficacious. [In the extraordinary case, already quoted, Dr. Pickells gradually increased the dose of common turpentine to six ounces.†] A child of ten or eleven years old may take an ounce without any evil effect in ordinary cases; but, in delicate habits, a full dose sets uneasy on the stomach, and disquiets the system generally, though in different ways; for it sometimes produces a general chill and paleness, sometimes a tendency to sleep, and sometimes an alarming intoxication. It is in small doses alone, as half a drachm or a drachm to an adult, that it enters into the circulation, and proves an acrid irritant to the bladder, often exciting bloody urine.

The subject requires farther attention than it has hitherto received; for it is probable, that some of the terebinthinate essential oils, while equally deleterious to worms, are less disposed to disagree with the stomach and affect the system, as the Hungarian balsam, or distilled oil of that variety of the *pinus silvestris* which has been called *MUGHOS*; or the distilled oil of the green cones of the same tree, formerly called *oleum templinum*; and at one time sold at a high price, and as a great secret, by German itinerants under the name of *KRUMMHOLZÖHL*.

[In 1823, Dr. Kennedy proposed the exhibition of the oil of croton for completing the expulsion of intestinal worms, after their destruction by oil of turpentine, or other anthelmintic medicines.‡ In Italy, the oil of croton has been recently tried by Puccinotte§ as a means of destroying *tæniæ*, as well as procuring their prompt discharge. One drop of the medicine was exhibited in beef-tea, at intervals of two or three days; the first dose expelled many fragments of the worm; and a little perseverance in the plan soon effected a perfect cure. This suggestion promises to be of much value; for it merits particular notice, that the oil of croton answered in this case, when several other active remedies had failed.]

The petroleum, pisselæum, and animal oil from horns, all of them highly esteemed as vermifuges in former times, possess like virtues, but in a subordinate degree, and are more unmanageable in preparing them for the stomach. Chabert, Goeze, and Professor Bremser,|| of Vienna, who has cultivated this subject more attentively, perhaps, than any other pathologist in Europe, unite some one of these empyreumatic oils with the oil of turpentine, giving a third part of the former with two-thirds of the latter: one or two tea-spoonfuls of this mixture being the ordinary dose at night and noon.

GEN. XI.
SPEC. III.
Helminthia.
By whom
first em-
ployed.
In what
proportions
given.

Oil of
croton.

Empyreu-
matic oils.

* Journ. Encyclop. 1731. † See Trans. of Assoc. Physicians, &c. Ireland, vol. v. ‡ Lond. Med. Repository, Feb. 1823. § Annali Universali di Medicina, Aprile e Maggio, 1825. || Ueber lebende Würmer in lebenden Menschen, 4to. Wien. 1819.

GEN. XI.
SPEC. III.
Helminthia.
Samphire.

Sulphure-
ous pre-
parations.

Sea-water
and other
solutions of
muriate of
soda.

Their use
illustrated.

Taken in
very large
quantity.

[According to Dr. Larini,* the plant called samphire (*Crithmum maritimum*), is a powerful vermifuge, especially in cases of lumbrici; a virtue that seems to depend upon its containing an oil very similar to petroleum.]

The sulphureous and Harrowgate waters appear to act in like manner; they are double irritants, and probably goad the worms while they stimulate the bowels. [Whether pure sulphur, uncombined with oxygen, or the alkalies, has a vermifuge power, is sometimes doubted.†] But the efficacy of all these is far less, than that of the essential oil of turpentine.

Concentrated sea-water, or a briny solution of sea-salt in spring-water, has been recommended from very high authorities, and has been found in many instances highly advantageous. It acts upon the same double principle as the preceding, though probably with more energy. The acrimony of sea-salt is troublesome to every variety of intestinal worms. I have already observed, that it is the best prophylactic against the attack of flukes in sheep, while it gives, at the same time, a healthy stimulus to the visceral organs; and where leeches, or indeed any of the erratic division of worms or larvæ are suspected, we are nearly certain of its proving a ready cure from its effects on the same animals out of the body. In the case of maw-worms, it is better to throw up the brine in the form of an injection; but where these are found to be migrating up to the stomach, it should be taken by the mouth. There is a striking example of the benefit of this treatment published by Mr. Leigh Thomas, of Hawarden, Flintshire. The patient is stated to have been reduced to a very high degree of danger, and to have suffered from the disease, almost without intermission, for five years, perpetually wishing for death to put an end to his tortures. He was cured by the accidental recommendation of this remedy of salt and water, which was stated to have wrought wonders in a similar case. He accordingly swallowed two pounds the next morning, dissolved in two quarts of spring water: he was vomited and purged violently, but discharged, by both apertures, a prodigious quantity of ascarides involved in mucus. He suffered, at the same time, much from the common effects of so large a portion of sea-salt, and particularly from strangury; but finding, that he had now obtained an engine with which to move the invading host, he repeated the same dose a few days afterwards, and with the same effects, both good and bad. In a few days, however, he lost every painful symptom, and gradually recovered perfect health.‡

On what the anthelmintic virtue of tin-filings depends is somewhat doubtful: nor can they be regarded as an efficient medicine. Yet Dr. Alston was much attached to them, and especially as a cure for the tænia, and gave them in doses of from two drachms to an ounce, in treacle. He ascribed their benefit to a slight combination with arsenic; but it is now fully ascertained, that the metal is at least as successful in its purest

* Mem. of the Acad. of Turin, vol. xxv.
Med. l. 57, p. 201.

† See Dict. des Sciences
‡ Med. Trans. of the College, vol. i. art. iv. p. 54.

state; and its effects are generally supposed to be altogether mechanical. This is certainly the case with crude quicksilver, though not with the gray mucilage of mercury, or the lunar pill, which probably stimulate the tender skin of intestinal worms, and especially those that are fond of burrowing in the mildest mucus, to some spastic and painful retraction. The last was a favourite vermifuge with Boerhaave; and Baldinger was as fond of the first, and asserts that it is peculiarly efficacious in expelling the long thread worm.

GEN. XI.
SPEC. III.
Helminthia.
Crude
quicksilver.
Lunar pill.

Perhaps the most powerful and successful of the irritants that act by an external power, is the prickly and pungent down of the pods of the cowhage (*dolichos pruriens*, Linn.), which has long been held in deserved estimation. This plant is a native of India. One of the first accounts, if not the earliest, published of it in this country, is that of Mr. Kerr, at that time a resident at Patna. It was addressed to the Professors of Medicine at Edinburgh, and was given to the world in the Medical Commentaries.* Its powers as an anthelmintic were at the same time detailed by Mr. Cochrane, whose character of it was soon afterwards fully confirmed by Dr. Bancroft, from long personal observation in South America.† After stating the frequency of worms of all kinds in that quarter, and endeavouring to account for it, he adds, that, from whatever cause these worms originate, their number is so great, and their power so prolific, that the usual remedies are insufficient for their destruction; for which reason the planters in general have been induced to employ cowhage. "Who first suggested it," says Dr. Bancroft, "I know not, but its efficacy is indisputable. The part used is the setaceous hairy substance growing at the outside of the pod, which is scraped off, and mixed with common syrup, or molasses, into an electuary: the dose, a tea-spoonful to a child, and double to an adult, in the morning, fasting, and repeated the two succeeding mornings, after which a dose of rhubarb is usually subjoined." The planters in this manner commonly give it once in three or four months to their slaves in general, and especially to the children of their slaves; and the author tells us, that he has known it thus administered to hundreds, from one year old and upwards. The patients, after the second dose, usually discharge an incredible number of worms, mostly the long round and the long thread-worm, amounting to more than twenty at a time, the stools consisting of hardly any thing else. And irritating as these spiculæ are to our own skin, when involved in the viscid materials with which they are mixed up, they do not seem to form an inconvenient medicine; and Dr. Bancroft never saw any evil produced by it. Of its effects upon the vermicular ascaris, he says, he cannot speak, as he has not seen it tried for this variety of invagination. For this last purpose, the best mode of employing it is in the form of muci-

Dolichos
pruriens, or
cowhage.

By whom
first recom-
mended.

How admin-
istered.

Powerful
effect.

* Med. Trans. of the College, vol. ii. p. 82. 202.

† Essay on the Natural History of Guiana, London, 1770.

GEN. XI. laginous injections. It was a favourite medicine with Dr. Mac-
SPEC. III. bride, who has warmly recommended it.*

Helminthia.

Second
class of
vermifuges.

A bitter
principle in
these not
sufficient
alone.

Shown by
the seeds of
santonica.

Of the vermifuges that seem chiefly to operate on worms, by attacking them internally, and to expel them by destroying their life, it may be observed, that almost all of these possess great pungency and bitterness; but that those which have obtained this character, and are bitter alone, are but little entitled to it, and are only of use when combined with some acrimonious irritant. We have already remarked, that even the intense bitter of the colocynth does not destroy worms: and Dr. Cullen judged the same respecting the seeds of the *artemisia santonica*, from their repeated anthelmintic power, vernacularly called WORM-SEED, so warmly espoused by Baglivi, and supposed, at one time, to be a specific against the long-worm. "It is said," observes Dr. Cullen, "to be the lumbrici teretes (the long-round worm, *ascaris lumbricoides* of the present system), to which they are especially adapted; but, from Redi's experiments, it appears that bitters are not an immediate poison to these animals; and Professor Murray properly observes, that "if the semen santonicum (worm-seed), according to Baglivi's experiments, operates more quickly, it must be by something else than its bitterness that this seed operates. I am uncertain if I have ever been possessed of the best kind of this seed, but must say, that what I have seen has hardly ever appeared to me to be a powerful medicine."† So far as my own observations extend, I can confirm this opinion. But the seeds are so often adulterated with those of other plants, and especially those of southern-wood, that it is difficult to speak with precision.

Other an-
thelmintics,
combining a
bitter with
an acrid
principle.

The same remark may be made in respect to tansy, savine, rue, bastard dittany, or fraxinella (*dictamnus albus*, Linn.), and not the dittany of Crete, which is an origanum, the seeds of the *chenopodium anthelminticum*, or worm-goose-foot, angelica, and many other leaves and seeds of slighter efficacy, which have had their day, and are forgotten, some of them undeservedly so. They have all more or less a bitter principle, in combination with some acrid quality, which exacerbates the energy of the bitter, and renders it doubly obnoxious to these internal parasites. And it is to these principles we are to ascribe the efficacy of the pomegranate root, one of the most common, and, according to Dr. Ainslie, one of the best established vermifuges in India. Linnéus asserts the angelica (*angelica Archangelica*) to be peculiarly serviceable in expelling the gordius, or hair-worm; and that it is in common use for this purpose in Lapland, where this variety of vermination is indigenous.

Assa-fœ-
tida; its an-
thelmintic
principle
uncertain;

On what ground assa-fœtida is to be held as an anthelmintic, I do not exactly know. Hoffman regarded it as one of the most powerful medicines in the vermifuge class; and Dr. Cullen tells us, that he has no doubt of its being entitled to a place in the

* Introduction to the Theory and Practice of Medicine.

† Mat. Med. part i. chap. ii. p. 62.

class, though he confesses that he has seldom found it effectual ; which, however, he imputes to our not having it in so recent and diffusible a state as were to be wished. It is very probable, indeed, that it loses much of its virtues with the loss of its freshness ; for Kæmpfer informs us, from his own observation, that a single drachm of the recent juice smells stronger, than a hundred pounds of such as is commonly sold in Europe. Like the preceding medicines, therefore, it is not improbable that whatever anthelmintic virtue *assa-foetida* possesses when fresh, depends upon a bitter principle combined with a pungent and volatile aroma.

GEN. XI.
SPEC. III.
Helminthia.

but its
power prob-
ably de-
rived from
a like union
of virtues.

The hellebores, helleboraster, and cevadilla, which is usually regarded as a species of *veratrum*, or white hellebore, though the specific characters have not been very clearly ascertained, are pungent bitters united with a strong cathartic power, and are hence very active vermifuges ; but they are too violent for common use, for they often do more mischief than the disease for which they are a remedy. The seeds of the cevadilla are so pungent as to be caustic in their pure state, for they are usually contaminated with parsley and hellebore seeds ; and are hence often employed in decoction, or some other form externally, to destroy bugs, lice, and other vermin. The dose, for a child from two to four years old, is two grains ; at eight, five grains ; from eight to twelve, ten. These are all powerful er-rhines. Tobacco is possessed of all these qualities, and unites with them a deadly narcotic power. It is hence, therefore, a decisive vermifuge ; but, from its violence, can rarely be used except in injections, in which form it succeeds admirably against the small ascarides.

Hellebore
and cognate
plants.

Tobacco.

Gamboge seems chiefly to act as a drastic purgative, bearing down all before it ; for though, when held some time in the mouth, it discovers considerable acrimony, it has few pretensions to bitterness. Yet, as it is said to be peculiarly efficacious in detaching and expelling the tape-worm rather than the other kinds, it probably acts also by some specific power with which we are not acquainted.

Gamboge.

There are some medicines, however, that may be regarded as specific vermifuges ; or, in other words, as acting upon worms, and detaching or destroying, by some simple quality, which proves highly offensive or poisonous to them, without affecting the bowels ; and which, therefore, prepare them for rejection by any purge that may be given afterwards : the chief of which seem to be the bark of the shoots of the cabbage-tree (*areca oleracea*, Linn.), the bark of the bastard cabbage-tree (*Geoffroya inermis*, Linn.), and the male fern.

Specific
vermifuges.

The two former are West Indian and American plants, and the barks are employed in the form of infusion, decoction, syrup, and even powder. Both have a mucilaginous and sweetish taste, and the first a disagreeable smell. Their destructive power depends upon no sensible quality ; for though, when given in large doses, they will vomit and purge violently, they prove far less anthelmintic in this proportion than when administered in doses

GEN. XI.
SPEC. III.
Helminthia.

that lie easy on the stomach and bowels, and do not pass away with rapidity. By such retardation the worms are exposed to their full influence, and are either killed or rendered sickly, so that it is necessary to take a dose of jalap or calomel, or both, for their removal. The vermifuge is given in the morning, for eight or nine days in succession, and the purgative on the day ensuing. From the offensive smell of the *Geoffroya*, it has also been called bilge-water-tree. It was first brought into notice in our own country, as a common and almost infallible vermifuge in Jamaica, by Mr. Duguid,* and afterwards more fully described and recommended by Dr. Wright.† The decoction is made by boiling an ounce of the fresh-dried bark in a quart of water till it acquires the colour of Madeira wine: the syrup is prepared by adding sugar to the decoction. The former has found a place in the extant Edinburgh Pharmacopœia.

Geoffroya
inermis, or
bastard
cabbage-
tree.

The *areca oleracea* has been long known to the world as a valuable plant for other purposes than the present. Its medulla, or pith, forms an excellent sago; and its green tops are cut, and eaten as cabbages; whence, indeed, its vernacular name of cabbage-tree. For a knowledge of its virtues as an anthelmintic, we are, however, chiefly indebted to Dr. Rush, who principally tried it in the form of syrup, which is of a pleasant taste, and which he asserts to be an infallible antidote. It is used, he tells us, very generally by physicians in the West Indies; and he himself has employed above thirty pounds of it, without knowing it to fail in a single instance. It is especially available against the long-worms. It was, antecedently to this, tried at Edinburgh, in the form of powder, but relinquished, as too rough and violent a medicine. In that of a syrup, it is sufficiently mild, and neither purges nor vomits, but in an overdose.‡ Dr. Monro has since introduced it into St. George's Hospital, and in various cases found it successful.§

Areca ole-
racea, or
true cab-
bage tree.

Filix mas,
or male fern.

The *filix mas*, or male fern, is not the only species of the ferns whose roots have been employed as simple vermifuges; for the *osmundia regalis* has acquired, with some practitioners, as high a reputation; but the favour of the public has been so much more extensively bestowed on the former, as to enable it altogether to eclipse the pretensions of its rival. It was very difficult to say on what the destructive power of the male fern over worms, and especially the *tænia*s, depends; for to the taste, it discovers but little activity, and has little or no aroma. It is glutinous, sweetish, very slightly bitter, and sub-astringent, may be taken in very large quantities, and appears to be incapable of expelling worms, how much soever it may destroy them, without the aid of active cathartics. And hence, many writers of authority, and among the rest Dr. Cullen, are doubtful of its possessing any anthelmintic power whatever.¶ The German writers, however, give examples of *tænia*s discharged whole, or

Its destruc-
tive prin-
ciple over
worms not
thoroughly
known.

And hence
differently
esteemed by
different
physicians.

* Essays, Physical and Literary, vol. ii.

† Edin. Med. Comm. vol. i. p. 329.

‡ Mat. Med. part ii. chap. i. p. 41.

† Phil. Trans. vol. lxxvii.

§ Edin. Med. Comm. vol. ii. p. 97.

in long portions, and perfectly dead, after an exhibition of repeated doses of this medicine, where no cathartic whatever was made use of; and Dr. Parr asserts, that he has met with like examples in his own practice. And hence it appears to exercise some poisonous effect on worms, though harmless to the human stomach.

GEN. XI.
SPEC. III.
Helminthia.

About the year 1770, the male fern was brought into great notice in Switzerland and France, by the celebrated Madame Nouffleur, who, under her own process of using it, boasted of it as a specific, but kept the process to herself. The secret was at length purchased by the king of France, and liberally communicated to the world. The patient, according to M. Baumé's statement,* after being prepared at night by an emollient clyster, and a supper of panada, is, early the next morning, to take three drachms of the fern at a dose, and to repeat it instantly, if the stomach should reject it. Two hours after which he is farther to make a bolus, consisting of twelve grains of calomel, twelve grains of resin of scammony, and five grains of gamboge, which, it must be confessed, seems admirably calculated for a triumphant issue in some way or other; for it will probably either kill the worm or kill the patient. It is by no means necessary to give so violent a cathartic.

Used by
Madame
Nouffleur.
Her patent
preparation.

It is far less difficult to account for the real or supposed specific virtues of the Indian-pinks, or worm-grasses, for there are two species of the spigelia that have been employed for this purpose: *s. anthelmia*, and *s. Marylandica*; and for those of the Indian scabious shrub, called by the natives cattu schiragaam. These are all acrid narcotics; in large doses, as above two drachms, or two drachms and a half, sometimes purging violently, sometimes producing vertigo, dimness of sight, drowsiness, and clonic convulsions; and sometimes producing all together: and hence, the same violent effects being excited, perhaps in the parasitic worms as in the patient, it is not to be wondered at that they should fall a sacrifice to them, or endeavour to save themselves by a timely and rapid escape. The scabious shrub, however, seems to act more feebly than the Indian-pinks, and is little to be depended upon; while the latter are far too acrimonious for general use.

Indian-
pinks, or
worm-
grasses.

Indian
scabious.
All acrid
narcotics.

Before closing the subject, I will just observe that Dr. Friske, of Brunswick, has lately employed electricity as an anthelmintic, or rather with a view of killing the worms in their mucous domiciles, by passing powerful shocks through the abdomen. He thinks he has by this plan destroyed even the tænia; yet he does not choose to rely upon this practice without the use of active cathartics.

Electricity
as an an-
thelmintic.

There is also a much milder remedy that has for some time been adopted in Germany, upon the efficacy of which I cannot speak from personal knowledge, but which is well worthy of attention; and especially in respect to patients of irritable stom-

* *Elémens de Pharmacie.—Précis de Traitement, &c. publié par ordre du Roi. Paris, 1775.*

GEN. XI. aches and emaciated constitutions; and that is, the use of mare's
SPEC. III. milk, particularly in cases of tænia.

Helminthia. [Injections, containing sulphate of iron, are stated to act very
Mare's milk powerfully in destroying ascarides.*]
in cases of
tænia.

Sulphate of
iron.

GENUS XII. PROCTICA.

Pain or derangement about the anus, without primary inflammation.

Scope of the
genus.

THE name for this genus has been taken from Linnæus; Seegar and Macbride have formed a like genus, under that of Proctalgia. In the scope in which it is here employed, the author included six species; all of them occasionally met with as idiopathic diseases, though several of them, perhaps, more generally as symptoms or sequels of other affections. [The species, proctica simplex, or simple pain at the anus, has now been omitted by the editor as an unnecessary distinction, throwing no light either on pathology or practice. The species are therefore reduced to five :]

- | | |
|-------------------------|------------------------------------|
| 1. PROCTICA SPASMODICA. | SPASMODIC STRICTURE OF THE RECTUM. |
| 2. ————— CALLOSA. | CALLOUS STRICTURE OF THE RECTUM. |
| 3. ————— TENESMUS. | TENESMUS. |
| 4. ————— MARISCA. | PILES. |
| 5. ————— EXANIA. | FALLING DOWN OF THE FUNDAMENT. |

SPECIES I. Proctica Spasmodica.—*Spasmodic Stricture of the Rectum.*

Pain in the rectum remittent, sometimes intermittent; increased during expulsion of the feces; volume of the feces slender but variable; rigid grasp of the sphincter on introducing the finger; structure of the bowel sound.

Proximate
cause.

STRICTURES of the rectum are produced by a spasmodic contraction of its sphincter muscles, or by a thickening and induration of its coats. The first forms the species before us: it is the simplest and least formidable of the two affections, though generally very obstinate; it also occurs by far the least frequently, and has hence attracted but little of the attention of medical writers. The second, which often terminates in a scirrhus disease, will be found to constitute the next species.

Predisposing
causes.
Natural arrangement
of the fibres
of the
sphincter.

The glandular structure of the rectum renders it peculiarly irritable, and the natural arrangement of the fibres of its sphinctres give it an habitual tendency to contract. It is hence easy to conceive, that any undue stimulus may excite an inordi-

* See Med. Intelligencer, vol. iv. p. 246.

nate degree of contraction in the sphincters, which may be propagated to a greater or less degree of ascent through the muscular tunic of the bowel. This inordinate action will, at first, be disposed to cease on a cessation of the stimulating cause; but if the stimulating cause be frequently repeated, or of long duration, the contraction may become permanent, and continue to exist after the cause has been removed.

A like predisposition to inordinate and permanent contraction may take place, as Mr. Copeland has ingeniously remarked,* from the peculiar structure or peculiar extent of the sphincter fibres in particular individuals. Anatomists have not come to an unanimous agreement, whether these fibres, issuing from the exterior and the interior surfaces of the extremity of the rectum, and freely decussating and intermixing in its substance, be two distinct muscles, or only a single one. The older anatomists seem to have been of the latter opinion; Dr. Baillie, M. Petit, and M. Portal speak of them, and describe them as distinct sphincters. Be the fact as it may, we sometimes find, that the two layers of fibres do not act correspondently, and that the contractile power of the one follows, instead of keeping pace with, that of the other, or evinces some other mode of inaccordancy, so that the entire muscle is seldom left in a state of perfect rest and relaxation. And we also find, that, in some individuals, even where the action is harmonious, the contractile organ is too broad or too powerful to be overcome by the expulsive power of the abdominal muscles; and, consequently, that the feces are expelled less frequently and less freely than they ought to be; whence a habit of costiveness is induced, and the confined excrement, becoming acrimonious by its lodgment, forms a permanent source of irritability, and is constantly augmenting the contractile propensity.

Any other local irritation, under such an irregularity of muscular structure, must have a like effect: as a daily use of acrid purgatives, in small quantities, with a view of counteracting costiveness; irritable caruncles, or excrescences at the verge of the anus; a tumescent, and especially a varicose state of the internal hemorrhoidal vessels. And even where there is no such irregular construction of the sphincters as we are now contemplating, any of these accidental sources of stimulus, in a debilitated and irritable habit, or a debilitated and irritable state of the alimentary canal, in which all of them are most prone to occur, may lay a foundation for the same complaint.

Mr. Copeland has favoured the world with some valuable remarks upon this disease;† but the only writer who has hitherto distinctly described it, by what may be called a close and full length portrait, is Dr. Baillie;‡ and I shall avail myself of his words, as containing a correct expression of the complaint.

After noticing that strictures of the rectum are almost constantly produced by a thickening of its coats, in the progress

GEN. XII.
SPEC. I.
Proctica
spasmodica.

From a peculiarity of their structure in different individuals.

Habitual use of active purgatives.

* Observations on the Principal Diseases of the Rectum and Anus, Sect. IV.

† Observations on the Principal Diseases, &c. Sect. IV.

‡ Med. Trans. vol. v. art. ix.

GEN. XII.
SPEC. I.
Proctica
spasmodica.

of which ulceration very commonly takes place on the inner surface of the bowel, and the patient is ultimately destroyed, as the ulcer has no tendency of itself to heal, and the art of medicine has hitherto failed in communicating to it any healing disposition, this distinguished pathologist proceeds as follows :

Description
by Baillie.

“ Another kind of stricture, however, occasionally occurs in the rectum, much less formidable in its nature, which is very rare, and has hitherto been taken little notice of by practitioners. This is not attended with any diseased structure of the coats of the rectum, but depends upon a contraction, more or less permanent, of the sphincters of the anus.

“ A good many years ago, a very well marked case of this kind fell under my notice, an account of which it may not be improper to communicate to the College.

“ The patient, in whom this disease occurred, had been long subject to an herpetic eruption on his right leg. This suddenly disappeared, and a certain quantity of blood was then daily evacuated by the bowels at the time of passing a stool, for five or six months. When the discharge ceased, there came on a good deal of difficulty in having a motion, which was immediately followed by a considerable sensation of pain in the very lowest part of the rectum. This pain generally continued from a quarter to half an hour, and then subsided entirely until the next time of having a motion. When the stools were examined, they were found to be very small in their diameter, to be flattened upon their surface, and to be serpentine or twisted. In the course of the disease, when there was an effort to have a motion, the external sphincter of the anus would sometimes hardly open itself, so that fluid feces only would escape at such times, and in small quantity ; or if any solid feces were allowed to pass, they were so squeezed by the very narrow aperture of the sphincter, as to become nearly as thin as a riband. At other times, the sphincter was much more disposed to open itself, and the stools were then of a considerably larger size, and of a less flattened shape. At no time, however, the motions were of the usual size, or of a perfectly cylindrical form. An examination of the rectum was occasionally made per anum, and the rectum was always found to be so much contracted as to admit with difficulty the fore-finger. This contraction extended to the upper limit of the internal sphincter of the anus, above which the cavity of the bowel was of its usual size. The internal membrane of the rectum in the contracted part was perfectly healthy. It was soft, not thicker than usual, and moved very readily on the inner surface of the contracted sphincter. The patient was in good general health, looked well in his countenance, was not the least emaciated, and his pulse was of the natural frequency.

“ The patient was very averse to the introduction of a bougie, and this instrument was never passed into the rectum. Nothing therefore was done, except keeping the bowels free from costiveness, and pursuing a very temperate mode of living.

The disease gradually became very much less, and although it has not altogether subsided, yet hardly any inconvenience is felt from the remaining degree of contraction. It is now nearly seventeen years since the commencement of the disease.

GEN. XII.
SPEC. I.
Proctica
spasmodica.

"This case is very different in its nature from the usual stricture of the rectum, and it is of considerable importance that it should be distinguished from it in practice. In the one case, the prognostic would be favourable; and in the other case, it would be generally very much the contrary. Upon a slight degree of attention, the two cases might be confounded, but when accurately examined, they may at all times be clearly distinguished from each other. In both cases, the feces will be found to be flattened in their shape, small in their size, and in some degree serpentine or twisted; but the other symptoms will be found to be very different. In the common stricture of the rectum, the situation of the stricture is generally two or three inches above the outer sphincter, and there is a sound capacious portion of the bowel between the stricture and this sphincter. At the seat of the stricture the coats of the rectum are felt to be more or less thickened, and not uncommonly in the cavity of the stricture there is a hard irregular ulcer. Although this disease has in its early stages little influence upon the constitution, yet when it has made a farther progress, the powers of the constitution become very much weakened, great emaciation generally takes place, and the patient is destroyed. In the other species of stricture produced by a contraction of the sphincters of the anus, the contraction is found upon examination to be at the anus, or very lowest extremity of the rectum, the inner membrane of the rectum is discovered to be sound,* and the general health is not impaired."

In a particularly obstinate case of spasmodic stricture of the rectum, that fell under the care of our author, bougies of all sizes and descriptions were tried; and some tubercles, which were situated at the verge of the anus, were repeatedly cut away; but without success. He adds: I cannot, however, but regard this as an extreme case; and, in those of less violence, should still recommend the daily use of bougies of as large a size as can at first be borne without much inconvenience, gradually increasing them in diameter: for where the resistance is capable of being overcome, this is the most effectual method. In the mean time, vapour baths, or the warm bath of a bidet, may occasionally be used with advantage: and where there are exacerbations of pain, they may often be taken off by small opiate injections, not exceeding an ounce or an ounce and a half in quantity.

This probably an extreme case.

In slighter cases, bougies serviceable.

Vapour bath.

In the case above referred to, little benefit was ever derived from local applications of any kind, whether in the form of vapour, warm water, or cataplasms. It was most unfortunate that opium could not be had recourse to; for in every proportion, whether large or small, it threw out a lichenous rash over the

Local applications in the above case of no use.

* See Fr. Salmon on Stricture of the Rectum, p. 19. Lond. 1828. 8vo.

GEN. XII.

SPEC. I.

Proctica
spasmodica.Idiosyn-
crasy pre-
vented the
use of
opium.
Its singular
effects.Belladonna
of no use,and at
length mis-
chievous.Both might
be service-
able in
other cases.Æthiops
mineral and
sulphur
found a
convenient
aperient.

surface of the body, but more especially over the extremities, possessing a heat, itching, and pricking more intolerable than the prickly heat of the West Indies, and which was almost sufficient to excite madness. From the dilatation produced in the orbicular fibres of the iris by a drop or two of infusion of belladonna, I recommended that the bougies, when they were employed, should be smeared with a preparation of the same plant; but no sensible benefit was hence obtained. The belladonna was afterwards employed in the form of pills, each containing a grain of the extract. One of these, introduced into the rectum by a small ivory tube with a piston, that thrust it out when it had ascended about an inch high, was at first employed every night alone; in a few days, night and morning; and then one in the morning and two at night. No effect of any kind was experienced till the dose was thus enlarged; and here all the mischievous results of belladonna were produced, and nothing else. The tongue swelled, and lost its power; the head was confused and giddy; the mind wandered; and the sight and hearing were obtunded. Having been warned of such possible effects, and the means of removing them if they should occur, the friends of the patient had immediate recourse to the plan laid down; and, by the aid of copious stimulating and cathartic injections, and cordial draughts, a recovery was accomplished in about twelve hours.

It is obvious, however, that this case was governed by an idiosyncrasy not often to be met with: and hence, notwithstanding the failure both of opium and belladonna in a single instance, I should feel it my duty to try either or both with unhesitating freedom in other examples, and should do it with a strong confidence of benefit. Mr. Copeland informs me, that he has often been successful with the latter; and, in some instances, where every other attempt at relief had failed.

I will just notice farther, that, in the above case, after a trial of almost all the aperients in the *Materia Medica*, the most convenient has been found about eight or ten grains of the black sulphuret of mercury, with about two drachms of sublimed sulphur in addition.

I have the satisfaction of adding, that, since the above particulars were written, the disease, though not entirely subdued, has been considerably diminished, and comparatively produces but little inconvenience.

Other cases, that have occurred to me of the same complaint, have been less painful and far more easily overcome. In a young lady of eighteen, whom I now see only occasionally, and who could never be persuaded to use a bougie, it has given way, after nearly two years' standing, principally by a use of the hip-bath for half an hour every morning before she made an effort to evacuate the bowels.

SPECIES II. *Proctica Callosa*.—*Callous Stricture of the Rectum*.

Difficult and painful expulsion of the feces ; feces lax, or of invariable slenderness ; permanent constriction felt by the fore-finger above the sphincters ; structure of the bowel thickened and indurated in the constricted part.

A CAREFUL attention to the pathognomonic characters laid down in the above definition will easily distinguish this species from the preceding, which, though more troublesome in its commencement, is far less formidable in its issue ; since the latter, if not timely attended to, is frequently found to terminate in an ulcerated schirrus, and sometimes a cancer.

GEN. XII.
SPEC. II.

The disease for the most part commences its attack so insidiously, that the patient has no suspicion of the real nature of the case. He feels a troublesome costiveness, which he ascribes to almost every thing rather than the real cause, and endeavours to alleviate it by various kinds of cathartics. These, while they afford temporary relief, add, by the habitual irritation they produce, to the primary and unsuspected malady ; and the next symptom, perhaps, is that of piles, or what is so conceived from a varicose state of the hemorrhoidal vessels, and the natural tendency of all mucous canals to evince most excitement at their extremities.

Disease commences insidiously :

and hence often ill-treated from mistake.

In the mean time, the morbid part of the gut continues to thicken and harden in its coats, its bore diminishes in diameter, and the efforts to expel the recement become more violent. The stools are now of a still slenderer and often of a twisted or serpentine form, and have the appearance of convoluted earth-worms, or butter squeezed by a piston through a confectioner's syringe.

Progress of the disease.

Thus far, however, the constitution suffers perhaps but little ; and the patient, to his friends, may appear to be in the zenith of health. But if the rectum be tried by the finger or a bougie, a morbid change of structure will be perceived, that threatens the most alarming results. The sphincters will probably be found pliable and free from disease, and the part of the gut immediately above them, for two, three, or more inches, will be equally healthy ; but the stricture, as soon as it is reached, will, perhaps, scarcely admit the passage of the finger, and oppose its entrance by the semblance of a hard cartilaginous ring ; or if it be not thus indurated and rendered scirrhus, it may be studded by a circle of tubercles, or intersected by a network of membranous filaments. And if a sound or bougie be passed through the neck of the stricture, another stricture may be found higher up, and again repeated to the sigmoid flexure of the colon ; where perhaps the disease originated, and whence it has worked its way downwards ; the colon possessing naturally its least diameter at this point, and the feces being here most easily delayed in their progress, not only from this increased narrowness of the passage, but also from the curved line in which they have to move forward into the rectum.

State of the gut when the disease has formed there.

GEN. XII.
SPEC. II.

Proctica
callosa.

Painful
effects.

Whether the stricture be thus complicated or not, the narrower its aperture becomes, the greater the difficulty of passing the feces, which necessarily accumulate, and distend the bowel above, excite eructations and gripings, and occasionally lay a foundation for that species of colic which we have already described as issuing from this source, under the term *colica contracta*. The feces can now be discharged only in a fluid state; and there is a sanious oozing from the anus, accompanied with a certain degree of tenesmus, which is rather troublesome, than severely painful.

Abscesses
and ad-
hesions.

"At this period," observes Mr. Copeland, who has admirably described the progress of the disease,* "abscesses very frequently form in the neighbourhood of the anus, and sometimes break into the vagina of the female, and the feces are discharged through the fistulous orifice. In the male, an adhesion takes place to the bladder, and the abscess discharges itself with the urine, and sometimes feces and wind are voided by the urethra. But more frequently the matter makes its way through the nates, as in cases of common fistula, for which disease it is not unfrequently treated. The patient often continues a long time in this distressing situation, for none of the vital organs are affected; till, at last, worn out with the pain and the discharge, or perhaps a total obliteration of the rectum, he yields to his fate. This is usually the progress and issue of the disease when it is not early discovered; and, I must confess also, sometimes the termination when it is; that is, when the parts are attacked with cancerous ulceration."

At length
terminating
fatally.

[In one case, however, which the editor lately attended at Halliford, the tenesmus was particularly severe. The disease indeed corresponded very closely to the following description. With the usual symptoms of stricture, there were the most acute lancinating pains in the part, extending through the pelvis to the loins and thighs; and every now and then the pains were followed by a sudden gush of bloody discharge from the bowel. When any feces passed, the suffering was extreme; and, for several months previous to the fatal termination of the disorder, there was a peculiarly fetid discharge from the anus. The patient was a gardener, more than seventy years of age; and he did not sink till his stomach became disordered. During the latter stages of the disease, the functions of the bladder were very much disturbed. The passage of a bougie into the rectum could never be endured, and even a glyster pipe was intolerably painful.

Causes.

The causes of the present disease are completely unknown. It is generally remarked by writers that it may originate from any kind of irritation of the rectum; yet, without some other circumstances conducive to the changes of structure, forming what is usually called a scirrhus-contracted rectum, simple irritation of the bowels will not bring on this afflicting disease.

* Observations on the Principal Diseases of the Rectum and Anus. Sect. i. p. 11. † Petit, Œuvres Posthumes, tom. ii. p. 93.

The case is sometimes suspected to arise from a peculiar morbid condition of the mucous glands of the rectum.* Dr. Baillie entertained this opinion, which he thought was confirmed by the fact, that such glands are most numerous at the lower part of the gut, where the disease is also most frequent. If this be the case, however, it only refers to the structure in which the disease commences, and throws no light on the cause of its commencement. The probability is, that the complaint is dependent on constitutional causes, like every other form of scirrhus. Desault found the disease to be much more common in the female than the male sex, in the proportion of ten to one: the subjects of it are also mostly advanced in years. This tends to support the opinion already delivered, respecting the operation of constitutional causes. A case was communicated to Dr. Monro, by Dr. Gregory, where the disease was ascribed to the insertion of a fish-bone in the coats of the rectum, as discovered after death.† The particulars recorded, however, do not warrant this inference, since the stricture might have occasioned the stoppage of the bone, and not the bone the formation of the stricture. This, at least, is the editor's view of the subject, and it is confirmed by various examples, in which cherry-stones or other foreign bodies have been detained in other parts of the intestines by strictures.‡ The idea of the disease ever originating from syphilis is now abandoned by every surgeon of judgment. Mr. Salmon refers to two specimens of the disease in an advanced stage: in both cases the mucous and muscular coats of the bowel have been absorbed, in consequence of the pressure of a new-formed substance, which, in one instance, has made its way into the bladder, and, in the other, into the vagina.§ These two cases, then, present one feature of carcinoma of the breast, namely, that which consists in the substitution of a new-formed substance for the original texture, which is absorbed. The projection of the new mass into the bladder and vagina, however, would rather indicate a character of fungus hæmatodes.]

The existence of transverse filaments, like that of cancer, is generally preceded by scirrhus, as remarked in the following passage of Dr. Baillie. The scirrhus "sometimes extends over a considerable length of the gut, viz. several inches; but generally it is more circumscribed. The peritoneal, muscular, and internal coats are much thicker and harder than in a natural state. The muscular, too, is subdivided by membranous septa, and the internal coat is sometimes formed into hard irregular folds. It often happens that the surface of the inner membrane is ulcerated, producing cancer. Every vestige of the natural structure is occasionally lost, and the gut appears changed into a gristly substance." These remarks are strikingly illustrated by well engraved figures in the author's *Morbid Anatomy*.||

GEN. XII.
SPEC. II.
Proctica
callosa.

Striking
change pro-
duced in the
structure of
the gut.

* Salmon, on Stricture of the Rectum, p. 63.
Anat. of the Human Gullet, &c. p. 22.
p. 31.

† See Monro's *Morbid*

‡ See case by Salmon, op. cit.

§ Op. cit. p. 63. || Plate iv.

GEN. XII. In a few cases of irritation, the transverse filaments have
 SPEC. II. been formed before the thickening of the gut has become callous,
 Proctica and have nevertheless been accompanied with all the painful
 callosa. symptoms just noticed. If, in this incipient state of the disease,
 Transverse these filaments be carefully removed, it has often happened,
 filaments often form- that an easy and radical cure has followed in a short period, of
 ed early, which Dr. H. Y. Jameson of Baltimore has lately published a
 and may be striking and instructive example.*
 removed at times easily.

Case, and
 dissection,
 by Ruysch.

Ruysch gives an instance of a scirrhus stricture of the rectum, which produced great agony, and terminated fatally, excited, as he supposed, probably without sufficient grounds, by a stricture of the urethra. On dissection, the pelvis of each kidney, and the middle of the right kidney, were found loaded with calculi; the rectum, through its entire length, was nearly of the thickness of the thumb, and so indurated as to render it difficult to say, whether the incrassation should be called flesh or cartilage: the canal was not wider than a straw; and so firmly had the intestine adhered to the sacrum, that it could only be separated by a mallet and chisel, the point of a knife having been previously tried in vain.†

[When the texture of the scirrhus-contracted rectum is considered, it must be confessed, that there is not only great difficulty in putting faith in the efficacy of any internal medicines, but also in giving credit to the statements of benefit derived from direct applications to the diseased part itself. Experience must be heard, however, and the authority of Desault can be brought forward in confirmation of the power of tents and bougies to relieve and even cure this formidable disease. Notwithstanding what was once asserted, pressure will not cure cancer of the breast; and it is puzzling to understand why it should ever succeed in cancerous affections of the rectum, unless the latter be presumed to be of a different nature from scirrhus affections of other organs. Yet Desault declares, that the disease can be cured, and has recorded examples of the successful treatment of what he conceived to be schirrus of the rectum. It is not every surgeon, however, that bows to this doctrine: and Professor Gibson delivers his own judgment very unreservedly when he remarks, that, whatever may be said to the contrary, genuine scirrhus, or cancer of the rectum, is absolutely incurable.‡ A similar prognosis is given by Mr. Salmon.§ In the example, which I attended at Halliford, the bougie could never be endured. Some palliation of the sufferings was produced by the exhibition of hyosciamus, joined with hemlock, opium, or the blue pill; and by the occasional use of castor-oil, anodyne clysters, the slipper bath, and fomentations. Our author, as the annexed remarks show, had confidence in the bougie.]

Treatment.

Pressure.

In the earlier stages of this disease, the steady use of a bougie, firm but not harsh, and lubricated with oil, of a size adapt-

* American Medical Recorder, April 1822.

† Institutes and Practice of Surgery, vol. i. p. 293.

‡ P. 358.

§ Op. cit. p. 64.

ed to the diameter of the stricture, so that it may press against its sides with a force short of uneasiness, will afford, in conjunction with gentle laxatives, the best chance of cure, and has in very numerous instances completely succeeded. The bougie may be retained at first for only a few minutes, as on its earliest use it will probably give pain, and irritate; but by degrees it should be borne for a longer period of time, and at length for several hours in a day. The pressure will promote absorption, and consequently reduce the morbid thickness of the coats, and hereby enlarge the diameter of the intestine; and as this last change occurs, and advances, it should gradually be met by a bougie of larger calibre, till the canal is restored to its proper dimensions. And even after this, it will be proper to return to the bougie occasionally, for a few minutes at a time, that there may be no relapse from the existence of a predisposing habit.

Nothing is so well calculated as the bougie, moreover, to break away that net-work of filaments which, as we have already observed, is sometimes united with an incrustation of the rectum, and spreads from one side of it to another. In this case there will usually be found at first a considerable degree of pain, and sometimes a considerable degree of hemorrhage; but a courageous perseverance will triumph over these, and amply reward the patient's exertions. And the tubercles, which are so apt to form on the loose and inner coating, will often yield and be carried off by the same means.

When, however, the disease does not yield to this plan, or has reached a more serious stage in its destructive progress, it becomes a direct subject of operative surgery: and a cure may yet be obtained by a removal of the tubercles by ligature or the knife; or a division of the thickened ring by a curved and probe-pointed bistoury. When, indeed, the disease is of so complicated a character as to embrace at the same time a contraction of the sphincter, M. Boyer has proposed also to divide this muscle; and asserts that he has often done it with success. But as it is not the intention of the present work to enter upon the province of practical surgery, I shall not pursue the subject any farther.

GEN. XII.
SPEC. II.

Proctica
callosa.
Bougies:
their fre-
quent suc-
cess when
employed
early.

How to be
used.

In what
respect they
act benefi-
cially.

Sometimes
a case for
operative
surgery
alone.

Division
of the
sphincter.

SPECIES III. Proctica Tenesmus.—*Straining.*

Painful and perpetual urgency to go to stool, with defection of mucus alone, and in small quantity.

WHEN this complaint is idiopathic, it is the result of local irritation, mostly produced by cold; the passage of acrid stimulating matter from the bowels; the mechanical pressure of confined enterolithi, or minute scybala; or an injudicious use of acrid cathartics, especially of aloes, which have a peculiar tendency to stimulate the lower part of the rectum. It is sometimes intolerably vehement, and accompanied with a protrusion of the gut; the mucous discharge is bloody, and the straining continues

Description
when severe.

GEN. XII. long after the intestine has emptied itself of every particle of its
SPEC. III. contents. And even when the patient has risen from stool, he
Proctica perhaps he tormented with a burning pungent heat,
tenesmus. and a perpetual urgency to expulsion. It is this violence of at-
tack, indeed, that chiefly distinguishes this species from the
symptomatic straining that occurs in the preceding, which is at-
tended with but little comparative pain, and generally ceases
upon the discharge of even a small portion of feces. The con-
stant urgency and torment wear away the sufferer's strength,
and sometimes extend the irritation to the bladder.

Sometimes
symptomat-
ic only.

Affections
of the pros-
tate gland,
uterus, or
urethra.

Treatment.

Most commonly, however, tenesmus is nothing more than a symptomatic affection, excited by some disorder of the bladder, as inflammation in its neck, or a calculus in its cavity; or by dysentery, chronic diarrhœa, costiveness, piles, worms (especially ascarides), and pregnancy; or, as just observed, by a stricture of the rectum, or its sphincter.

In all these cases, tenesmus can only be removed by a cure or palliation of the disease on which it is dependent: but where it is an idiopathic affection, a more direct course of treatment may be adverted to. If a lodgment of acrid materials form the cause, these should be freely discharged, and the irritation they have excited be subdued by bleeding with leeches, and a local application of opium, intermixed with soap and wax to prevent its being too quickly dissolved; or by small doses of ipecacuan, or of Dover's powder. In very painful extremes, opiate and mucilaginous injections will often alleviate the distress; or Goulard water with oil. Laudanum in a solution of starch is frequently employed with great benefit as a clyster; or the extract of opium may be introduced into the rectum as a suppository.

SPECIES IV. Proctica Marisca.—*Piles.*

Livid and painful tubercles or excrescences on the verge of the anus; usually with a discharge of mucus or blood.

Common
name of he-
morrhoids
incorrect,
and why.

THIS species has generally been described by modern writers under the name of *hæmorrhoids*, whence *hemerods* or *emrods* in old English, and *hemorrhoids* in the English of our own day. Now the literal meaning of *hæmorrhoids*, *αἱμορροΐς*, is "flux of blood;" and in this sense the term was used by the Greek and Roman writers, sometimes generally, and sometimes with a special application of it to menstruation, and particularly profuse menstruation, or uterine hemorrhage, but never with a *special* reference to hemorrhage from the anus, as I have already remarked in the Preliminary Dissertation to the volume of Nosology,* to which I refer the reader: and hence again, Aristotle denominates, by the term *Hæmorrhoids*, a serpent, whose bite was said to be succeeded by a violent and fatal flow of blood from the bitten vessels.† The name is, therefore, highly inadequate to the pur-

* Page 55.

† De Partibus Animal. lib. iii.

pose of expressing, with any degree of clearness, tubercles, or even discharges from the anus; yet it becomes not only inadequate, but absurd, when employed generally to indicate a family of diseases, some of which have a discharge of mucus instead of a discharge of blood, and others no discharge of any kind.

GEN. XII.
SPEC. IV.
Proctica
marisca.

For these reasons, as well as others stated at large in the comment to the volume of Nosology, I have deemed it expedient to adopt the Latin term *marisca* in the stead of *hemorrhoids*; and to limit the genus to those tumours or excrescences about the verge of the anus, which, under every view of the disease, form its prominent character.

Hence varied in the present system.

These enlargements commonly, and perhaps in every instance, derive their existence from a turgid and varicose state of the anal or hemorrhoidal veins; for, in their simplest forms, piles consist of nothing more than varices of these veins, covered with a slight thickening of the inner membrane of the rectum, as Dr. Baillie has sufficiently shown in his illustrative plates.*

How produced.

[Distinguishing piles from mere swelling of the veins, termed *hemorrhoidal varices*, to which the practice of excision is dangerous, Mr. Calvert says, they are first seen in the form of small fleshy tubercles, generally of a brownish or pale-red colour, and either situated within the anus, or descending from the rectum. They have rather a solid and spongy feel, and, when cut into, present a surface more or less compact and bloody, from which blood oozes, leaving the texture pale and more relaxed. When they are more external, they are paler, and generally, also, more elastic and transparent; and they appear and disappear more quickly than the former. Piles very often contain a central cavity, filled with fluid, or coagulated blood, and lined with either a smooth or granulated cyst. By means of fine anatomical injections, a few minute vessels may be demonstrated, through which the blood exudes into the central cavity, but no direct connexion exists with any of the larger vessels. The cavity usually does not exceed the size of a pea; but it is sometimes large enough to hold several drachms of blood. More generally, however, there is no regular cyst, but the substance of the tumour is infiltrated with blood, which eventually becomes dark and coagulated. Common piles subside and return at uncertain periods, and they become larger and firmer, in proportion to the frequency of the attack. Often, however, after some discharge of blood, they collapse, their cavity seems to be obliterated,† and they leave merely pendulous flaps, formed of stretched skin. But, when they have been strangulated for some time by the pressure of the sphincters, repeatedly gorged with fluids, or one of very long standing; they acquire more solidity, and become permanent, varying but little in size, and forming a source of almost constant pain, from protrusion, inflammation, or ulceration; or, by occasioning a distressing prolapsus of the anus. This permanent state of the tumours is referred by Mr. Calvert part-

* Morbid Anatomy, plate v. fi. 2, 3. p. 78.

† See Sir A. Cooper's Lectures, vol. ii. p. 336.

GEN. XII. ly to the development of the capillary vessels, by which the in-
 SPEC. IV. terstices are gradually obliterated, and partly to the coagulation
 Proctica and organization of the effused blood. Hence, the production of
 marisca. condylomatous tumours, and what are termed hemorrhoidal ex-
 crescences, all of which are solid, and can only be removed by
 the knife, or ligature. With respect to this description, the
 editor begs to observe, that all the several forms of piles are
 generally conceived by most practitioners, and probably with
 correctness, to be originally mere swellings of veins, whatever
 may be the solidity they afterwards acquire, or the seemingly
 small or indirect communication of their cavity with the venous
 trunks.]

Description. From local irritation, produced by indurated and retained fe-
 ces, or purgative stimulants, and especially aloetic purgatives;
 or from an undue determination of the blood to the hemorrhoi-
 dal vessels, by excessive walking or riding; or their turgescence,
 arising from enlargement of the liver or adjoining viscera; from
 the pressure of the gravid uterus on the pelvic veins; from the
 irritation of stone in the bladder; and often from a peculiarity
 of the constitution itself; the extremities of the hemorrhoidal
 veins are apt to become varicose, and swell into tumours;
 frequently accompanied with inflammatory action in the sur-
 rounding mucous follicles; the swellings enlarge gradually into
 caruncular excrescences, pea-sized, fig-sized, or of various other
 figures, sprouting about the verge of the anus within or with-
 out; and are often so painful as to prevent either walking or
 sitting. Sometimes the caruncles thus produced, are hard, flor-
 id, incompressible, without discharge, and intolerably sore to
 the touch. Sometimes irritation induces a secretion of whitish
 mucus from the neighbouring glands. Sometimes the hemor-
 rhoidal vessels themselves, that form or supply the sprouting
 tumours, are so distended as to burst, and bleed freely. And
 occasionally the inflammatory action gives rise to the formation
 of caruncles of different shapes and sizes, sometimes spreading
 about the perinæum, but mostly existing within the verge of
 the anus. Whence we obtain four distinct varieties as follow:

| | |
|-----------------|-------------------|
| α Cæca. | Blind piles. |
| β Mucosa. | White piles. |
| γ Cruenta. | Bleeding piles. |
| δ Caruncularis. | Caruncular piles. |

α P. Maris-
 ca cæca.
 Predispor-
 ing causes.

We have just observed that piles in their simplest state con-
 sist of nothing more than varicose tumours of the anal veins, cov-
 ered with a slight thickening of the inner membrane of the rec-
 tum: and I have pointed out a variety of causes predisposing
 to such tumours. The trivial term *cæca*, or *blind*, though not
 peculiarly expressive of the idea intended to be conveyed, has
 been applied for ages to the first example before us, which is
 void of every kind of discharge, whether mucous or sanguine-
 ous, and has no *eylet*, or aperture, through which such discharge
 may flow, and carry off the accumulation. Mariscal tumours,
 Mr. Copeland conceives, are most common in persons who pos-

sess a very strong action of the sphincter ani, and are hence habitually predisposed to a spasmodic stricture of the rectum. In such persons, he supposes, that on every expulsion of the feces, the internal membrane of the rectum, together with the vessels it contains, is protruded, and caught or detained, and some of its veins strangled by the forcible constriction of the muscle. That this is a frequent cause of piles I have no doubt, though, from their occurring in such numerous instances in persons of lax fibres and debilitated habits, it appears to me to operate less frequently than is suspected by Mr. Copeland.

Mariscal excrescences are likely to be the hardest, the sorest, and the most florid of the whole, when the result of such a cause. Where they proceed from a mere relaxation of the vascular system, or a diseased state of the larger abdominal viscera, they will sometimes acquire a considerable bulk without being highly painful; but, in this case, they are usually soft and compressible.

It will be better and more compendious to take a survey of the other varieties before we proceed to the curative intention.

In some persons, the mucous follicles of the interior membrane of the rectum are far more easily excited to secretion than in others; as we see in many individuals the mucous membrane of the nostrils pour forth a readier and more abundant defluxion. It is in this state that the tumours assume the name of WHITE OR MUCOUS PILES; and as the excretories thus easily evacuate themselves, there is much less soreness and irritation, and the tumours or tubercles are comparatively pale as well as moist; and, though often not admitting of so rapid a cure as some of the other varieties, are considerably less distressing.

It often happens that, from distention, the walls of the anal varices give way, and form BLEEDING PILES. Yet it does not always follow that blood is hereby discharged, or the tumours are diminished. For it occasionally occurs that the surrounding membrane does not give way at the same time, and consequently that the extravasated blood is accumulated in the contiguous cellular substance, and the tumours, instead of diminishing, increase from the size of a pea to that of a pullet's egg, block up the entire passage of the rectum, and are a source of very great evil. If, however, this take place at some distance above the sphincter ani, where the parts yield more easily, the pain may not be excessive; but if these enlarged tumours be seated on the sphincter, or within the range of its contractile influence, the torment induced is often intolerable.

From this difference of seat, piles from of old have been denominated external and internal; and it was imagined by Dr. Stahl and his disciples, that the former were produced by a gorged state of branches from the vena cava, and the latter from a like congestion in branches of the vena portarum. No benefit, however, can possibly result from such a distinction; nor is the distinction itself founded on fact: for all the arteries and veins that appertain to the lower part of the rectum arise

GEN. XII.
SPEC. IV.
α P. Marisca cœca.

β P. Marisca mucosa.
Cause.
Character.

γ P. Marisca cruenta.
Hemorrhage not always a result of the bursting of a vein.

External and internal piles, the meaning of.

GEN. XII.
SPEC. IV.

γ P. Marisca cruenta.

Hemorrhage, however, generally follows. Apt to become habitual.

Cannot be suppressed without danger.

δ P. Marisca caruncularis. How produced.

Description.

To be distinguished from other caruncles in the same neighbourhood.

Treatment.

Laxatives.

Peculiar action of sulphur.

Treatment. Balsam of copaiva.

so diversely, and anastomose so frequently, that an affection of one must be communicated to another, and the general result be participated by the whole.

In most cases, however, in which the varicose vessels burst, the distended and attenuated membrane that surrounds them bursts at the same time, and the blood flows externally. The hemorrhage is, in some cases, very considerable: and as this variety, more than any of the others, is apt to run into a habit, the constitution occasionally becomes greatly debilitated, and often dropsical; and the hemorrhage has, in a few instances, been so profuse as to endanger the life. When, moreover, a hemorroidal habit is once established, the flux, even if it do not undermine the health by its quantity, often becomes periodical, enters into the chain of constitutional actions, and becomes a condition of the corporeal weal; so that its suppression is attended with serious mischief.

It often happens, and especially during the first variety, which evinces the highest degree of inflammation, that an effusion of coagulable lymph takes place around the mariscal varix, which terminates in vascularity, and the production of a fleshy substance that still continues even after the overloaded vessels have recovered their proper diameter and tone. It is these CARUNCLES, which are rather the sequels of piles than piles themselves, that constitute the fourth variety. They are of different shapes and sizes, bulbous, soft, and compressible, red or reddish; and not unfrequently the base shrivels into a narrow neck, while the body of the caruncle enlarges and elongates so as to assume a polypous appearance.

Caruncles, not very unlike, are frequently found sprouting from the cuticle or cutis that surrounds the anus, often assuming the appearance and having much of the nature of warts; solitary or clustering, with a broad or narrow base; and which are sometimes regarded as piles, but are altogether of a different origin.

In attempting a cure of this complaint, our first attention must be directed to the cause, as far as we can ascertain it. If the bowels be habitually costive, gentle laxatives should be employed daily; and where the complaint has been induced by excessive walking or other muscular exertion, quiet and a recumbent position must be sedulously enjoined. The laxatives in either case may be the cassia or senna confection; oil of castor, where it will sit easy on the stomach, with the addition of a little spirit, which is its best corrective; and sulphur. Sulphur has long been regarded as a specific for piles; but I do not know, that it possesses any other virtue than that of being a mild aperient. It seems, however, to be an aperient peculiarly calculated to act upon the large intestines; since, being soluble with difficulty in animal fluids, it dissolves slowly, and does not spend itself till it has descended to a considerable depth in the alvine canal.

Dr. Cullen was in the habit of employing in this complaint the balsam of copaiva. After observing that, like turpentine, it

proves aperient, he proceeds as follows:—"Whether a certain effect of balsam of copaiva is to be imputed to this operation, I cannot determine; but must observe, that I have learned from an empirical practitioner that it gives relief in hemorrhoidal affections, and I have frequently employed it with success."* His dose was from twenty to forty drops, properly mixed with powdered sugar, once or twice a day.

GEN. XII.
SPEC. IV.
Proctica
Marisca.

I have tried this medicine often, and when it has appeared useful, it has been chiefly in the case of mucous piles; I am hence induced to ascribe its salutary effect rather to the common principle, on which it is well known to act in irritations of mucous membranes generally, than to its laxative power.

In what way
useful.

Where the pain and tension are very distressing, relaxant cataplasms and fomentations are generally advisable. The common bread-poultice with a solution of opium is one of the best.

Cataplasms.

The butter of chocolate may be advantageously employed for the same purpose, either as a most mild emollient ointment, in the form of a suppository, with a small portion of spermaceti, or as an exquisitely bland bougie with a nucleus of cotton.

Butter of
chocolate.

If we can clearly refer the disease to a gorged or obstructed state of the liver, or any other abdominal viscus, the purgatives we employ may be of a more active kind, and a free use of the lancet should precede them. And if the piles should depend upon a strong tonic action of the sphincter ani, bleeding from the arm will also be highly useful; but the local application of leeches will answer better.

When the
lancet
should be
used.

In every variety, indeed, in which there is much heat, hardness, and irritation, leeches will be found an important remedy; and when these symptoms are hereby removed or mitigated, we should have recourse to local tonics and astringents. The patient may sit frequently in a bidet of cold water, or apply cataplasms of cold water and crumbs of bread; or, if the tumours be seated above the sphincter, use injections of cold water. With the water we may often advantageously intermix the earthy or metallic astringents, as alum, sulphate of zinc, or the superacetate of lead. Where the tubercles are not very sore, they will often yield to a layer of gypsum, or, what is better, Fuller's earth, which, however, should be rubbed into as soft a paste as possible. This is a remedy which has been long employed on the continent;† and I have sometimes prescribed it with singular success, and have known piles, when softish and compressible, removed by it in a single night.

When
leeches
especially
serviceable.
Local
tonics and
astringents.

Metallic
astringents.

Gypsum.
Fuller's
earth.

Several vegetable astringents are well entitled to our attention for the same purpose; and especially the powder or extract of catechu, which I have known to be serviceable to external tubercles in the form of ointment, and to internal ones in the form of an injection. And Dr. Cullen speaks with equal favour of finely pounded oak-galls, in cases where the disease is not connected with the general habit.‡ A mild solution of the

Vegetable
astringents.
Catechu.

Oak galls.
Nitrate of
silver.

* Mat. Med. part ii. cap. v. p. 190. † Eph. Nat. Cur. Dec. iii. Ann. iii. Obs. 162. ‡ Mat. Med. part ii. chap. i. p. 46.

GEN. XII. nitrate of silver will, however, often be preferable to any other
SPEC. IV. astringent.

Proctica
Marisca.
Bougies.

If these should fail, the pressure of bougies should be had recourse to, and especially in piles supposed to be produced by a constitutional entonic constriction of the sphincter muscle; for in this case it will have a tendency to remedy both the cause and effect at the same time. Suppositories and bougies for this purpose are of long standing and high recommendation. With a view of uniting the two advantages of pressure and cold, they were formerly recommended to be made of slices of any of the cucurbitaceous fruits, as cucumber, gourd, or melon;* but none of these are sufficiently stiff to obtain an adequate expansile force; and hence the large rectum bougies in common use have been advised. I have sometimes seen them made of very finely polished ivory, of a conic shape, about the length of the fore finger, with a ringlet at the base; and the exquisite smoothness and equality of pressure they possess peculiarly fit them for the purpose. Mr. Bell proposes a bougie or tent formed of a silver tube, wrapped round with soft linen, or a piece of sheep's gut tied at one end, and then pushed to a sufficient height into the rectum, and forcibly distended with water.†

Cucumber
supposito-
ries.

Ivory
bougies.

Bladder
bougies.

Fistulous
ulcers often
from a gleet.

Tubercles
when to be
removed;

not advis-
able by
caustic.

Advantage
and disad-
vantage of
ligature.

Occasionally nature has effected a cure; and the effused substance has been absorbed without any artificial means whatever:‡ but more generally neglect produces the most lamentable consequences, and especially fistulous ulcers of very difficult removal; which have sometimes indeed, as Mr. Gooch has sufficiently exemplified, wormed a sinuous path, and opened into the vagina.§ And hence, if none of the preceding means should be found to answer, and especially if the tubercles be extremely painful and distressing, they should be removed with all expedition by ligature, caustic, or the knife. Of these, the use of caustic is by far the most unadvisable, whether actual or potential. Of the other two methods, it is not easy to say which is the preferable; and hence each has been in favour with different practitioners. The chief disadvantage of the ligature is, that, by tying up the surrounding membrane of the intestine along with the immediate substance of the tumour, a very high degree of sympathetic irritation, and even inflammation, has at times been excited over the whole range of the intestinal canal, and even the perinæum, and a degree that has in some instances proved fatal: the ligature appearing to act, as M. Petit observes,|| in the same manner as the pressure of the tendinous rings of the abdominal muscles in cases of strangulated hernia; and producing the same effects of incessant hiccough, vomiting, abdominal inflammation, and gangrene. This, however, rarely occurs, except when the ligature is applied round several tumours at the same time, or during their inflamed state; for if only one be operated upon at once, and the rest in succession,

* Morgagni, De Sed. et Caus. Morb. Ep. xxxii. art. 12.—Lange, Miscell. Verit. p. 104. † Surgery, vol. ii. chap. xvi. p. 259. ‡ Marigues, Journ. de Méd. tom. xxxii. § Cases, &c. p. 249. || Œuvres Posthumes, tom. ii.

the irritation has not been generally extensive, or of longer duration than two or three days. And perhaps even this might be avoided, by denuding the tumour of its external covering, as M. Petit has proposed.

The chief difficulty that attends the operation of excision is a very troublesome, obstinate, and debilitating hemorrhage, which is apt to follow, and which many surgeons have found very hard to restrain; chiefly, perhaps, because the veins of the abdominal viscera are destitute of valves. Sir Astley Cooper has once or twice found it prove fatal, and hence, though in his earlier years an advocate for excision, he afterwards gave a preference to the ligature.* Excision, therefore, is chiefly calculated for the caruncular variety, and in such cases is far preferable to the ligature: but where we have reason to believe, that the varicose vessels are of a large diameter, the knife should not be had recourse to. [Mr. Calvert, who has written some judicious observations on piles, makes a practical distinction between the firmer swellings, whose cavity or cells have but a small or indirect communication with the large veins, and other tumours, which he calls hemorrhoidal varices, and consist entirely of dilated veins. The latter are the cases, to which the practice is inapplicable. According to this author, hemorrhoidal varices are generally of a dark, or bluish colour, soft and elastic to the touch, resembling in this respect ripe grapes; and when compressed by the finger, they are evidently diminished, but return to their former state as soon as the pressure is removed. Their shape is also very different from that of other hemorrhoidal tumours; being broader at the base, rounder, and sometimes distributed in irregular clusters, like similar affections of the venæ saphenæ. Tumours may also be presumed to be of this nature, when they can be traced from the anus far up the rectum.†] Cutaneous excrescences about the anus, erroneously denominated piles by the vulgar, may be taken off with a knife or a pair of scissors, in any number, or to any extent, without reserve.

GEN. XII.
SPEC. IV.
Proctica
Marisca.

Treatment.

SPECIES V. Proctica Exania.—*Falling down of the Fundament.*

Inversion and prolapse of the villous tunic of the rectum, from entony or relaxation of the sphincter.

THIS is a very common and a very troublesome disease: but it is capable of a perfect cure in most cases, and of great relief perhaps in all. There are two varieties of it, proceeding from the two opposite causes of atony and entony, and which demand a very different mode of treatment.

α Atonica.

Relaxed Exania.

β Spasmodica.

Spasmodic Exania.

* Lectures, &c. with additional Notes by F. Tyrrell, Esq. vol. ii. p. 342. 8vo. 1825. † See Calvert's Practical Treatise on Hemorrhoids, &c. 8vo. Lond. 1824.

GEN. XII.

SPEC. V.

Proctica

Exania.

 α P. Exania atonica.

Cause of

this variety.

The prolapse sometimes very extensive.

β P. Exania spasmodica.

How produced.

A return easily effected in atonic prolapses.

But a radical cure difficult.

Strengthening the relaxed membrane.

Where the action of the sphincter is feeble, it collapses readily, and often imperfectly; and the part of the rectum that always descends towards the verge of the anus upon a protrusion of the feces, instead of being retracted with elasticity, remains exposed, or ascends imperfectly. Yet there is little pain or tumour, and reduction is easy. Under such circumstances, exania, or a prolapse of the inner membrane of the rectum, will often occur on the slightest dejective effort: but if, at the same time, the rectum be labouring under any morbid irritability from the stimulus of scybalous feces, ascarides, or purgatives, the protrusion will be greatly exacerbated, a much larger portion of the gut will be exposed, and its retrocession will be more difficult. Sometimes, indeed, the portion exposed has been very considerable; for Morgagni relates a case, in which the valvulæ of the colon were hereby brought into view;* and Hagen† another, in which there was a prolapse of the entire colon itself.

Common, however, as is the disease before us from local or general debility, it is perhaps still more frequent from that habitual or accidental excess of contractile action in the sphincter of the anus. [The editor doubts the correctness of this explanation, and believes, that the case, here described, does not arise from excessive action of the sphincter, but rather from a bad habit of sitting long at stool, and from the protracted efforts of straining, in which many muscles tend to propel the rectum and its contents downwards, the sphincter and cellular connexions of the gut becoming thereby in time so weakened, that a prolapsus ani ensues. The editor conceives that, in the production of the first variety described by the author, spasm of muscles has more share, particularly when there is irritation about the rectum from piles, or other cause, though, of course, the repeated protrusions will naturally, at last, weaken the sphincter.] If the tumour remain down, it becomes large, irritable, and painful; and, if assistance be not obtained soon, a violent and serious inflammation will be sure to supervene.

In the atonic prolapse, but little aid is necessary, in ordinary cases, to return the protruded part. A simple pressure of the hand against the denuded part of the intestines, or sitting upon a plain and hard seat, will ordinarily be sufficient; and, if not, an introduction of the fore-finger up the anus will always succeed. Hence patients, labouring under this variety, commonly return the gut themselves after evacuation, and in many instances it will ascend of its own accord.

The chief difficulty is in effecting a cure; which can only be accomplished in two ways: by invigorating and bracing the loose and relaxed membrane; or giving it an adhesion to the subjacent cellular substance from which it is detached.

The first may sometimes be accomplished by local tonics and astringents; as cold water dashed against the buttocks, injections of cold water, solutions of alum, or sulphate of zinc, or an infusion of catechu or gall-nuts.

* De Sedibus, &c, xxxiii. LXV. 6.

† In Schroeder Verm. Schr. band i. p. 609. 1778.

The second can only be accomplished by artificially exciting a slight continuous inflammation in the cellular substance, by slipping off a small piece of the protruded membrane as recommended by Mr. Hey, or passing a ligature through a small portion of it, and letting it remain after the return of the membrane, till the inflammatory action has commenced: by which means a radical cure is often obtained, in the same manner as a like cure is effected in scrotal dropsy, by hooking forwards and cutting off a small piece of the tunica vaginalis after evacuating the water. Mr. Copeland has employed this method in various instances, and with all desirable success.

GEN. XII.
SPEC. VI.
Proctica
Exania.
Producing
adhesion
with the
cellular
subjacent
substance.

Where there is a prolapse of the upper part of the rectum, or of the colon, the disease is of a different kind; for, in this case, the entire parietes descend, and the upper part is invaginated in the lower, as in an intromission of the smaller intestines; but with less mischief in the present instance, as there is more space for play, and as the intestinal canal evinces less sensibility, and consequently admits of harsher treatment in its progress towards its lower extremity. In this case, the whole we can aim at is to strengthen the fibres of the relaxed bowel, and restore them to a healthy elasticity by the use of tonic and astringent injections.

Prolapse of
the upper
part of the
rectum.

In entonic or spasmodic exania, it will be often necessary to apply leeches, and to bleed pretty freely before a reduction can be obtained. After which, as this is chiefly a result of spasmodic stricture, or depends upon like causes, the mode of treatment already recommended for the one will be the best plan to be pursued for the other.

Leeches
often neces-
sary in the
second
variety.

This complaint is also found occasionally as an effect in lithiasis, proctica marisca, helminthia podicis, scirrhus of the prostate gland, fistula ani, and other affections of the uterus, vagina, bladder, and neighbouring organs.

Found as a
sequel or
effect of
other
diseases.

CLASS I. COELIACA.

ORDER II.—Splanchnica.

DISEASES AFFECTING THE COLLATITIOUS VISCERA.

Disquiet or diseased action in the organs auxiliary to the digestive process, without primary inflammation.

THE order of diseases, upon which we now enter, is in the present classification denominated SPLANCHNICA (ΣΠΛΑΓΧΝΙΚΑ), as primarily affecting, and being seated in, the viscera that are directly adjuvant to the function of digestion. The term SPLANCHNICA is thus reduced to its more limited and emphatic sense: for, in a loose and broader signification, it imports, like its Latin synonym *viscera*, all the larger bowels or internal or-

CLASS I.
ORDER II.
Splanchnica, its
various
senses.

CLASS I.
ORDER II.
Its meaning
in the
present ar-
rangement.

Organs
included
under it.

gans, to whatever cavity they appertain, and consequently includes the brain: but in its stricter and more exact meaning, it was formerly confined to those of the upper and lower belly, comprising what we colloquially call the ENTRAILS; and more especially those which were consulted by the aruspices, and constituted the chief parts of the sacrifice: in which sense it is mostly employed by Homer, and the Greek tragedians.

The organs, therefore, to which the term is here intended to be applied (for the alvine canal forms the subject of the first order), are the liver, spleen, pancreas, mesentery, and omentum; and as, in the physiological proem to the class before us, we took a general survey of the structure of these organs; and, so far as we are acquainted with them, of the parts they respectively fulfil in accomplishing the economy of digestion, we shall proceed, without farther delay, to a consideration of the diseases which belong to them under the proposed arrangement.

The order embraces four genera:

| | |
|-------------------|----------------------|
| I. ICTERUS. | YELLOW JAUNDICE. |
| II. MELÆNA. | BLACK JAUNDICE. |
| III. CHOLOLITHUS. | GALL-STONE. |
| IV. PARABYSMA. | VISCERAL TURGESCECE. |

Of these, several comprise numerous species, which will be noticed in their respective places.

GENUS I. ICTERUS.—YELLOW-JAUNDICE.

Yellowness of the eyes and skin; white feces; urine saffron-coloured, and communicating a saffron dye; the course of the bile obstructed.

How named
by the
Greeks and
Romans;
from un-
certain ety-
mologies.

THIS disorder was by the Greeks denominated ICTERUS (ΙΚΤΕΡΟΣ) as above, and by the Romans, as Celsus particularly notices, Morbus arquatus, or Morbus regius: but on what account either of these names has been given to it, we have no satisfactory information. Arquus means a rainbow, which requires more explanation than has hitherto been given; and the meaning of regius, as expounded by Celsus, will, I apprehend, content very few. "Its cure," says he, "is to be attempted by exertions of every kind, luso, joco, ludis, lascivia, per quæ mens exhilaretur; OB QUÆ REGIUS MORBUS DICTUS VIDETUR:"*—'by play, jests, sports, and dalliance, on which account it seems to be called Morbus regius, or the royal disease.' It has also been named by many writers, ancient as well as modern, *Aurigo*, evidently from its golden hue. But, of the origin or meaning of icterus, we are left altogether in the dark by the critics and lexicographers. It appears to the present author, however, probable, if he may venture upon a subject which has hitherto been tried in vain, that all these terms are expressive of a common idea; and, though not derived from a common root, are employed as equivalents to express its meaning. Icterus (ΙΚΤΕΡΟΣ), as it seems to him, is the Hebrew term

Probable
origin of
both the
Greek and
Roman
names.

* Medicin. lib. iii. sect. xxiv.

כתר with a formative י producing יכתר or “icter,” and importing as a verb, “to surround, circumsure, encompass;” and, as a noun, “a royal crown, or golden diadem.” Icterus was a term also given to the golden thrush or golden pheasant, on account of its golden plumage: and hence the bird was fabled to be connected with the disease; and it was believed, according to Pliny, that if a person labouring under the jaundice should look at the pheasant, the bird would die, and the patient recover. Regius, arquatus, aurigo, are not indeed univocals, but very clearly equivalents, and equally import gold, golden crown, golden bow, or circumfusion; the colour of the disease, and its encompassing the body. There are other diseases, however, that produce, or are accompanied with, a yellow tinge of the surface, as well as jaundice; as aurigo,* and sometimes porphyra or scurvy. Frank mentions a case of the latter, in which there was an intense yellowness of the whole skin, chiefly proceeding from broad maculæ, even to the palms of the hands and soles of the feet.† But, in all these cases, the albuginea is little or not at all affected, and the urine does not communicate the saffron dye of jaundice.

GEN. I.
Icterus.

Other diseases also marked by a yellow tinge of the surface.

What the use of the bile;

or of the liver.

The liver found in animals of almost every rank;

and bile secreted even where no liver is discoverable.

There is, however, a far more important enquiry immediately connected with this subject, which I am afraid will be still less easily settled. We are sufficiently acquainted with the seat of jaundice, which is the liver, and of its proximate cause, which consists in an impeded flow of the bile; but who shall explain to us the real use of the bile, or even the final use of the liver, that secretes it? Considering the large size of the liver in all animals that possess it, and, at the same time, how generally it is possessed, being, to all red-blooded animals, as common as the heart itself, there can be no doubt, that it is of great importance in the animal economy, notwithstanding our uncertainty of the part it performs.

Even below the rank of red-blooded animals, we often discover it, and of great extent; as in the snail, oyster, and muscle; and frequently, too, where we cannot trace an organ answerable in structure and appearance to the liver, we are obliged to admit the existence of an organ that supplies its place; for there are many insects, as the larvæ of the *cynips querci*, or gall-fly, and that of the *circulio nucis*, or nut-weevil, that secrete bile in such quantity as to tinge with a brownish-yellow the tender branch, nut, or other substance, in which they find a habitation, and to give it a taste as bitter as ox-gall.

The direct and obvious office of the liver is the secretion of bile, which, in most animals, is suffered to accumulate in a pear-shaped reservoir, adhering to its concave surface, and denominated a gall-bladder. Yet in many animals, even of different classes, we perceive no such reservoir, as the elephant, rhinoceros, stag, camel, goat, horse, trichecus, porpoise, rat, os-

Gall-bladder wanting in many quadrupeds.

* Class VI. Ord. III. Gen. x. Spec. iv. † De Cur. Hom. Morb. Epit. tom. vi. lib. vi.

GEN. I.
Icterus.

Rule under
which it
may be
expected.

Case of an
infant in
which it
was not
found.

Perhaps no
bile ante-
cedently to
birth.

Whether
the bile acts
as an irri-
tant upon
the intes-
tines.

Not always
necessary to
digestion.

Difference
between
hepatic and
cystic bile.

Why this
difference?

Obstructed
flow of bile
the cause of
jaundice.

trich, and parrot: while we do not know of a reptile that is destitute of it. Upon the whole, however, it may be observed, that a gall-bladder is common to all carnivorous animals possessing a liver, and that it seems to be only wanting in those that feed on vegetables alone. Yet, while we see the distinction, we are ignorant of its cause, and incapable of applying it. In the human subject, it has sometimes also been wanting,* of which Dr. Cholmeley gives an example:† but such a deficiency has mostly occurred in infants who have perished soon after birth; before which period, as there is no transit of feces through the intestinal canal, and perhaps no peristaltic action, it does not appear to be necessary. Perhaps, indeed, antecedently to birth there is no bile secreted. In the case related by Dr. Cholmeley, although the whole of the bile, as fast as it was secreted, seems to have been carried back into the system, the sallowness of the skin is not noticed to have occurred till the day after birth; from which time the child exhibited a deeper and deeper hue, till it died of convulsions at the end of five weeks.

[According to Meckel, the want of a gall-bladder does not always dangerously impair the health;‡ and an example in which a person, with such malformation, reached the adult state, has been lately recorded.§ Cats bear the removal of the gall-bladder without fatal consequences.||]

It was stated in the physiological proem, that one supposed use of the bile is, to maintain the peristaltic action of the bowels. Yet Sir Everard Home¶ has given an example of a child that fed heartily, seemed to digest its food well, and had regular stools, and was nevertheless without a gall-bladder, or even a duct of any kind leading from the liver to the duodenum.

There are also a few other circumstances relating to the bile, that yet stand in need of explanation. The hepatic bile, or that secreted into the hepatic duct, is mild and sweet; the bile found in the gall-bladder is pungent and bitter; whence we might infer, that it is the gall-bladder that secretes the bitter principle. Yet in children the gall-bladder bile is as sweet as that of the hepatic duct; and in various insects, as we have already seen, a bile powerfully bitter is secreted without either gall-bladder or liver. Who shall develop the cause of these discrepancies? Who shall unfold to us the use of the bitter principle of the bile, or explain why it is necessary to the animal economy in an adult state, and not necessary in a state of infancy?

Yet, whatever be the use of the bile, or the office of the liver, we know that the general symptoms of jaundice depend upon an obstruction to the flow of the bile into the alvine canal, and its retrograde passage into the blood. [Thus, in animals, jaundice may be produced by applying a ligature to the

* Olivier, note sur l'atrophie de la vésicule biliaire, in *Archiv. Gén. de Méd.* tom. v. p. 196. † *Med. Trans.* vol. vi. art. iv. ‡ *Manuel d'Anatomie*, tom. iii. p. 468. § *Mém. de Méd. Militaire*, tom. xx. p. 406. || Sir E. Home. *Phil. Trans.* 1813, part ii. ¶ *Phil. Trans.* 1813, pp. 156, 157.

ductus choledochus; and, in the human subject, dissection has frequently proved its origin from the direct or indirect pressure of various swellings and indurations, either of the pancreas, stomach, spleen, omentum, and other organs, against the biliary ducts. The jaundice occasionally arising in pregnancy is sometimes ascribed to the pressure of the gravid uterus on the same canal, and sometimes to a plethoric state of the system, and of the liver in particular, in consequence of the suppression of the menses, which last opinion was espoused by Sauvages, Portal, and Powell.] It has been supposed, indeed, that the bile might, after entering into the intestines, be absorbed and carried into the blood, and by this means produce a jaundice, and a jaundiced hue, without any obstruction to its flow into the intestinal channel. But, in this case, it seems impossible, that the stools should not be tinged with a yellow, instead of presenting a white hue, which is one of the common characters of the disease. In order to constitute jaundice, there must therefore be some obstruction to the passage of the bile through its proper ducts into the intestinal canal. And this obstruction may proceed from five sources, each of which may be accompanied with peculiar symptoms, and consequently furnish us with the five following species:

GEN. I.
Icterus.

Produced
from five
distinct
sources.

- | | |
|-----------------------|----------------------|
| 1. ICTERUS CHOLÆUS. | BILIARY JAUNDICE. |
| 2. ——— CHOLOLITHICUS. | GALL-STONE JAUNDICE. |
| 3. ——— SPASMODICUS. | SPASMODIC JAUNDICE. |
| 4. ——— HEPATICUS. | HEPATIC JAUNDICE. |
| 5. ——— INFANTUM. | JAUNDICE OF INFANTS. |

The disease is also found symptomatically in pregnancy, colic, and fevers of various kinds; especially *epanetus ictorodes*, or yellow fever. [It is generally a sporadical complaint, but instances of its being epidemic, particularly at the termination of campaigns, in wet autumnal seasons, and also of its being endemic, are recorded.* The disease appears to have been epidemic at Cronstadt in 1784 and 1785, and at Geneva in 1814. In the latter city, it occurred after the hot weather of summer, being in some cases combined with a bilious fever; in others, not associated with any other manifest disorder.†]

SPECIES I. Icterus Cholæus.—*Biliary Jaundice.*

The course of the bile obstructed; general languor; nausea; dyspepsy; and occasional pain or uneasiness at the stomach.

THE specific term cholæus (χολαίος) is here restored from the Greek writers, among whom it has been common from the time of Hippocrates.

Dr. Cullen has not noticed this species: but it occurs in Bonet, Amatus Lusitanus, Forestus, Sauvages, and most of the later

Species not
noticed by
Dr. Cullen,
but by various
others.

* See Monro on the Health of Soldiers, 2 vols. 8vo. 1780. Pringle on Diseases of the Army. Edin. 1810. Alibert, Nosologie Naturelle, &c. 4to. Paris, 1817, &c. † See Dict. des Sciences Méd. tom. xxiii. p. 414.

GEN. I.
SPEC. I.Icterus
cholæus.Bile may be
inspissated
from various
causes.

writers. It is easy, indeed, to conceive that bile may become inspissated from various causes, and particularly from an absorption of its aqueous or thinner parts, by the lymphatics of the ducts themselves, or of the gall-bladder; from an augmented secretion of the albumen, or, as Berzelius considers it, the mucus of the gall-bladder dissolved in the bile; and from too viscid a texture of the bile, in its secretion in the liver. And, in effect, there are few observant practitioners but must have remarked that the evacuations, whether by the mouth or the anus, when the obstruction is just removed, consist at times of nearly pure bile, peculiarly tenacious and high-coloured.

Bile ab-
sorbed into
the blood.

[After the bile is secreted, if the hepatic, or the common duct, be obstructed, so that the passage of this fluid into the duodenum be prevented, it regurgitates into the liver, and is taken up by the absorbent vessels, and carried into the mass of the circulating blood,* in the serum of which it becomes dissolved, and thus gives it its own yellow colour. The blood, thus tinged, carries the dye with it to every part of the body, and hence the general hue of jaundice is produced. It would seem, however, that the bile, in a liver distended from obstruction of the ducts, is not only taken up by the absorbents, but is also forced into the mouths of the hepatic veins. In dissections, Dr. Saunders and Dr. Powell both noticed bile in the thoracic duct; and the first of these physicians found the serum of the hepatic veins in a dog, in which jaundice had been a short time before produced by a ligature on the common biliary duct, evidently more loaded with the colouring part of the bile, than the serum in other veins.† When the bile reaches the circulation, the intensity of tinge, which different parts receive, will be in proportion to their vascularity, and the quantity of colouring matter thus carried to them; or to the natural hue of the part being more or less calculated to show it, as in the eye, and white of the nails.]

Found most
frequently
in the
autumn.How com-
mences.Progressive
symptoms.

This species is found most generally in the autumn. In many instances it commences slowly and insidiously; there is felt a general restlessness, diminution of appetite, disturbed sleep at night, and disinclination for exertion of any kind: the urine is of a deep yellow, and deposits, perhaps, a pitchy sediment; the bowels grow sluggish, the dejections are clay-coloured, or whitish, and have not the usual feculent smell. In some examples, however, the bowels are loose. The eyes and surface of the body look yellower than usual, and there is a very troublesome itching of the skin. In this species, however, there is little or no pain in the right hypochondrium, and little or no sickness at the stomach, though a frequent sense of nausea.

* The actual presence of bile in the blood of jaundiced persons is denied by M. Deyeux (*Considérations Chimiques et Médicales sur le sang des ictériques*, 4to. Paris, 1809); and doubted even by M. Thenard. On the contrary, the researches of M. Clarion (*Journ. de Méd. an 13*), Orfila (*Elem. de Chim. Méd.*) Saunders, Alibert (*Nosol. Naturelle*, 1817), and others, tend to prove the correctness of the belief, as ancient as Hippocrates, that the bile passes into the circulation. † See Saunders on the Structure, Economy, and Diseases of the Liver; Powell's Obs. on the Bile, p. 56; Bateman, in Rees's Cyclopædia, art. JAUNDICE.

[In all cases of jaundice, except such as are very suddenly produced by the bites of venomous animals, and other particular causes, the yellowness commonly first shows itself about the inner angles of the eyes, the white of which is tarnished in a very early stage; but the whole cornea soon becomes manifestly yellow. On the temples, light-yellow patches are next seen, which daily assume a deeper and deeper tinge. Similar yellow discolorations then appear on the face, neck, and breast, and all at length spread and unite, so as to cause an universal tinge. Yellow semicircles at the roots of the nails make their appearance very early. It is a curious circumstance, however, in the history of jaundice, that the yellow dye of the skin should generally first show itself on the upper parts of the body, which are likewise the first to resume their natural colour.

GEN. I.
SPEC. I.
Icterus
cholæus.

Parts in
which the
yellowness
first shows
itself.

The tongue, palate, and teeth, have a yellow coating, not removable by repeated washing. Whatever the patient puts into his mouth frequently has a bitter taste; and, indeed, the bitterness in the mouth is very annoying, even not at meal-times. A partiality to acids and sourish food is also generally experienced.

State of the
tongue.
Bitter taste
in the
mouth.

In this affection, the pulse is ordinarily feeble. In the beginning, however, particularly if there be any pain in the hypochondrium, it is hard, and even frequent and full. But, after the pain subsides, the pulse has been known to sink to only thirty strokes in a minute, some examples of which are reported by M. Andree.*]

Pulse.

In an early stage of the disease, free vomiting is of essential service. During this action, the diaphragm and abdominal muscles contract concurrently; and the whole of the viscera of the abdomen are forcibly pressed upon. Such a pressure must necessarily, therefore, affect the gall-bladder and biliary ducts, and oblige them to pour out their contents very freely: nor is there a more powerful mean in our possession of unloading the liver of any viscous or stagnant fluid, or of restoring and invigorating its circulation. For this purpose, the antimonial emetics are preferable to those of ipecacuan. They are less readily rejected, and excite a stronger stimulus from the first; and hence the vomitings they produce will continue for a longer period of time. To these should succeed a brisk purgative or two, with a copious use of diluting, sub-acid drinks, which, in ordinary cases, will easily remove every symptom. But if the disorder, from the obscurity of its march, be not soon suspected, the impeded passages will become more obstinately obstructed, the gall-bladder and bile-ducts will be distended; there will be a general feeling of fulness in the right side, with great irritation and fever; which last will often continue for a week or a fortnight after the obstructing cause has been removed.

Medical
treatment.
Free vomit-
ing;

with anti-
monial
emetics.

Brisk pur-
gatives.

Effects
when
chronic.

Where the substance of the liver has been free, and the ducts alone obstructed, the quantity of bile that has accumulated in

* See Dict. des Sciences Méd. tom. xxiii. p. 408.

GEN. I.
SPEC. I.

Icterus
cholæus.

Accumula-
tion of bile
in the gall-
bladder
sometimes
enormous.

the gall-bladder has sometimes been enormous. In one instance, which terminated fatally, this reservoir was found, after death, to be so considerably dilated, as to be loaded with not less than two Scotch pints, or eight pounds, of this fluid.* [Whether this case ought to be received as a confirmation of the statements of Galen, Darwin, and Powell, that jaundice is sometimes the result of paralysis, from an immoderate distention of the gall-bladder, is a question not easily solved.] There is often a paresis or hebetude of action in the bile-ducts themselves; and where we have reason to suspect this, it will be most effectually relieved by the blue-pill, or small doses of calomel, or Plummer's pill, which is better than either, continued for two or three weeks at a time. If the liver partake of this torpitude, and no acute symptoms occur, the disease is apt to run into the fourth species, and must be treated accordingly.

SPECIES II. Icterus Chololithicus.—*Gall-stone Jaundice.*

The course of bile obstructed by bilious concretions in the ducts, which are at length protruded and discharged with the feces; frequent retching; acute pain in the hypogastric region, increased upon eating.

Closely
connected
with gall-
stone, or
chololithus.
Line of
distinction.

This species is the *icterus calculosus* of most of the Nosologists. It is so closely connected with the genus CHOLOLITHUS, or GALL-STONE, forming the third in the present order, in its general origin, symptoms, and mode of treatment, that the reader may be referred for almost all these to the latter. Yet it is necessary to give the two affections distinct places: for the yellow dye of the skin and urine, which forms a pathognomic symptom in icterus, occurs often, as we have already seen, without chololithus, even in its passing species and acute state, and very generally in its quiescent state. The liver itself is, in many cases, sound;† but it is often connected with a morbid condition of this organ, and proceeds, perhaps, in some instances, from a morbid secretion of bile, by which it becomes more disposed to crystallize. Dissection has shown, that the seat of obstruction is most frequently in the cystic duct; next in the ductus choledochus; and then in the hepatic. The rest will be explained under the genus CHOLOLITHUS.

SPECIES III. Icterus Spasmodicus.—*Spasmodic Jaundice.*

The course of the bile obstructed by a spasmodic constriction in the course of the bile-ducts; the disease commonly preceded by acrimonious ingesta, hysteria, or some violent passion of the mind; and spontaneously subsiding within a few days after these are removed.

THE general symptoms of this affection are those of the preceding species, or of *chololithus* means, which so closely agree

* Edin. Med. Essays, vol. ii. art. xxx.

† Heberden, Med. Trans. vol. ii. p. 124.

with the preceding: but the causes and mode of treatment are different; and it is necessary to attend to their specific signs, in order that they may be distinguished.

Spasmodic jaundice occurs for the most part in those of irritable habits, or whose liver, from a long residence in hot climates, from an undue indulgence in spirituous potations, or high-seasoned dishes, or from any other cause, is in a state of chronic irritability. So far as I have observed, it occurs more frequently in women than in men, probably from their passing a more sedentary life, and chiefly after menstruation has ceased, and the general form assumes a more corpulent shape.

There is also very commonly, in those who are subject to it, a sallowness of the skin, indicative of irritability and increased action of the liver, and of a larger regurgitation of bile into the blood-vessels than is necessary for the purpose of health. Dr. Heberden has observed that the liver is sometimes perfectly sound; and there is no doubt that this is a fact; for the irritability may originate in, and be confined to, the ducts; but it more generally commences in the liver itself, and is hence extended to the ducts, which, from their structure, are far more irritable, as well as more sensible, than the parenchyma, or general substance of the liver, and consequently far more susceptible of pain and spasmodic contraction.

[Spasm of the common duct is particularly mentioned by Dr. Cullen among the causes of jaundice, and Dr. Powell deems the fact well established, although it has often been denied. M. Andral enumerates four principal causes of the complete or incomplete, temporary or permanent, obstruction of the biliary passages, viz. the lodgment of a foreign body in them; their compression by membranous adhesions, or some kind of tumour; their spasmodic contraction; and the thickening of their mucous membrane from inflammation.* MM. Jourdan and Breschet, however, have expressed their suspicions, that the latter state also prevails in every instance reported to be spasmodic.† Jaundice frequently accompanies spasmodic diseases. Thus it is said by Sydenham to come on during hysterics, a circumstance which the editor has never seen, and which is denied by Dr. Heberden. According to Dr. Saunders, anger not only augments the quantity of bile, but likewise vitiates it. Hence, flowing into the duodenum in large quantities, and regurgitating into the stomach, it produces the same effects as an emetic; and hence, probably, the term *choleric*, as applied to passionate people. If the ductus communis should not transmit it as fast as it is secreted, and the gall-bladder be already full, then it will return towards the liver, and, by entering the blood-vessels, produce jaundice.* Dr. Bateman regarded this as the most probable explanation of the influence of the passions in producing a temporary jaundice, and of course he did not put much

GEN. I.
SPEC. III.

Icterus
spasmodi-
cus.

Resembles
the preced-
ing in
symptoms,
but not in
mode of
cure.
Pathology.

* Arch. Gén. de Méd. tom. vi. p. 16. † Manuel d'Anat. par J. J. Meckel, tom. iii. note, p. 469. ‡ Saunders, p. 235.

GEN. I.
SPEC. III.Icterus
spasmodi-
cus.

Causes.

Sympathetic
action of the
liver with
other parts.

faith in the doctrine of spasm.* Among the less common causes of jaundice, a thickening of the biliary ducts is mentioned by Morgagni, who records a case of a total obliteration of the common duct.†]

The primary cause of this disease we cannot always trace; but it is easily reproduced in those, who are subject to it, by flatulent, acrimonious, or indigestible food, or by violent mental emotion. It is often also reproduced, or even primarily excited, by cold in the feet, drinking cold water when the body is greatly heated, and a transfer of atonic gout from the extremities to the stomach, or any part of the intestinal canal. We have hence a clear proof of the strong sympathetic connexion which exists between the liver and various parts of the body. [The jaundice sometimes produced by corporeal suffering, irritation in the alimentary canal, and the bites of venomous animals, is referred by Hoffmann, Mead, and Bosquillon, to the spasmodic species.] An affection of the brain will also often produce jaundice;‡ and hence a frequent exciting cause is a sudden and violent burst of the depressing passions, as terror, jealousy, and despondency. It is, indeed, most probable, that the torpitude induced directly in the organ of the liver, from the exhausting heat of tropical climates, is also greatly augmented by the operation of the same cause on the skin, and the sympathy of the liver with this organ.

Description.

The disease is ushered in by a sense of fulness at the stomach, accompanied with great languor and nausea; a violent pain at the pit of the stomach soon succeeds, with an almost incessant sickness, and an utter inability of retaining either food or medicine of any kind. The pain grows intolerable, and shoots towards the left shoulder, or spreads round the loins, and girds them as with a cord. The epigastric region is greatly distended, and cannot endure the pressure of the hand; while the pulse exhibits little variation.

The bowels are for the most part costive, and moved with difficulty. [The stools are scanty, of a grayish, or clay colour, and, as long as the urine is of a deep yellow or saffron colour, voided with difficulty. But when this secretion becomes paler, they assume their natural yellowness again, are more copious, and the patient begins once more to be conscious of the sensation preceding or accompanying their natural expulsion; a sensation, that is lost while the bile continues to tinge the urine in a considerable degree. It should be understood, however, that costiveness does not always precede, or attend the first symptoms of jaundice; but as Monro, Pringle, and Powell attest, there is sometimes a considerable looseness, with grayish stools of a faint, or rather sour smell. At first the urine is yellow and quite limpid; but it afterwards becomes frothy, saffron-coloured, reddish, and very thick; sometimes almost black, depositing

* Rees's Cyclopædia, art. JAUNDICE.

† De Causis et Sedibus Morb.

Epist. 37. art. 10.

‡ Cases of Jaundice, &c. by Henry March, M. D. Dublin Reports, vol. iii.

a sediment like brick-dust, or dark blood. In proportion as the yellowness of the skin fades, the urine loses its saffron colour, and becomes clear again.] This colour shows itself the sooner in proportion to the violence of the other symptoms, and especially of the retching; and the surface of the body, and especially the fine sclerotic coat of the eye, assume the same livery. And if the disease become chronic, the yellow dye is not confined to the skin, or even to the fluids, but pervades every part of the body, the most compact as well as the most porous; so that the pericardium, the heart, the peritoneum, the meninges, the substance of the brain, the cartilages, and even the bones, are clothed with the common colour. Stoll,* Lieutaud,† Bartholin,‡ and Morgagni,§ give various examples of this; though the last observes that a yellow tinge of the brain is a rare occurrence.

GEN. I.
SPEC. III.
Icterus
spasmodi-
cus.

Yellow
tinge uni-
versal.

One of the latest fluids that becomes tintured is the milk in icteric wet-nurses; probably in consequence of its rapid passage and elaboration from the fluids introduced into the stomach. Dr. Heberden has remarked, that, in wet-nurses, the milk is never tainted with the bile either in taste or colour; but this assertion is too general, and at variance with the observations of other pathologists. Riedlin lays down the fact more correctly, in affirming that all the humours are *sometimes* coloured yellow.|| And hence, indeed, the only reason we can assign for the bilious and bitter taste that is often present in the stomach, insomuch that every thing the patient eats or drinks partakes of this quality: while the common bile-duct is locked firm, the intestines are without bile, and the stools are whitish or clay-coloured. The fact is, that the whole mass of blood is so impregnated with bile, that the saliva, and all the other lubricating secretions of the mouth, fauces, and œsophagus, and probably the gastric and pancreatic juices are loaded with the same material, so that the sense of taste cannot be otherwise than affected.

Milk affect-
ed latest.

Why a bit-
ter taste in
the mouth.

The jaundiced have, from a very early period, been said to see all objects of a yellow hue, as they appear to us when looking through a yellow object-glass; from which we may judge, that the humours of the eye, like the other fluids of the body, are also tinged, as Celsus observes,¶ with the resorbed bile, and communicate the tinge to the picture thrown upon the retina. Lucretius, so far as I know, is the earliest writer, of those that have descended to our own day, who has made this remark, which he introduces as illustrative of another subject, and appeals to as a familiar fact:

Whether
objects ap-
pear yellow.

Lurida præterea fiunt, quæquomque tuentur
Arquatei; quia luroris de corpore eorum
Semina multa fluunt, simulacris obvia rerum;
Multaque sunt oculis in eorum denique mixta,
Quæ contage suâ palloribus omnia pingunt.**

* Rat. Med. Part. iii. p. 386, et passim. † Hist. Anat. p. 190. ‡ Epist. iii. p. 419. § De Sed. et Caus. Morb. Epist. xxxvii. art. 7. || Lin. Med. 1697. Febr. Obs. 7. ¶ Medicin. Lib. iii. sect. xxiv. ** De Rer. Nat. iv. 333.

GEN. I.
SPEC. III.Icterus
spasmodi-
cus.

The jaundiced, thus, see all things round them clad
In yellow ; every object as it flows
Meeting new tides of yellow, from their forms
Thrown forth incessant ; and the lurid eye,
Deep, too, imbued with its contagious hue,
Painting each image that its orb assails.

Discredited
by Heber-
den and
Frank.Author's
own case.Circum-
stances ne-
cessary to
this effect.

Dr. Heberden, however, affirms, that all the jaundiced patients he has at any time attended have contradicted this opinion, with the exception of two females, whose testimony he is disposed to hold lightly ; and Professor Frank is decidedly of opinion, that no such affection takes place. Yet from a single case in my own person, produced, when a student, by long-continued pressure of the epigastrium against the edge of a table in copying my short-hand minutes of medical lectures, I can confirm the general opinion ; for, the first suspicion I entertained of my being affected with jaundice was from the yellow tinge with which every object around me appeared to be arrayed. To produce this effect, however, it is necessary, as already observed, that the crystalline lens, and, perhaps, all the humours of the eye, should be tinged, and acquire the yellow hue of the sclerotic coat. This certainly does not at all times take place ; and where the humours are unaffected, objects must certainly be seen in their proper colours ; but where they are thus tintured, and form a yellow transparent medium, it seems difficult to conceive how a picture transmitted through them can avoid catching their own dye ; and hence we may see why some persons, labouring under the jaundice, perceive objects coloured with yellow ; and others in their proper hues.

[The editor has reason to think the statement here made by the author, and which agrees with what Morgagni has said relative to this curious point,* is perfectly confirmed. Dr. James, in his Medical Dictionary, mentions having seen such disorder of vision in two old patients affected with jaundice. Hoffmann records two similar cases ; and Alibert met with an additional example in a girl who was in the Hôpital St. Louis. The rarity of this affection of vision in jaundice corresponds to, and depends upon, the rarity of the extension of the yellowness to the humours of the eye, with which state Professor Blumenbach† combines a vivid perception and application of mind, which are also very uncommon in jaundice.]

Chronic
form of the
disease.

I have said, that this species of jaundice, and the remark may be applied to all the species except the last, sometimes assumes a chronic form. In this case the distressing symptoms of severe spasmodic pains, intumescence, and sickness subside ; but the bile does not flow freely into its proper channel, and continues in a greater or less degree to be absorbed and carried into the circulation. The cause of this seems to be an insensibility and paresis approaching almost to a paralysis in the bilious

* Aliquando tamen, sed rarissime, fieri potest, ut flava in hoc morbo objecta appareant, nimirum si cornea tunica bile tota saturata sit, neque tum solum, quod et Mercurialis concedit, verum etiam si quando oculorum humores summa flavedine infecti sunt. † See Edin. Phil. Journ.

tubes, and a chronic irritability in the hepatic absorbents. Under these circumstances, moreover, the bile that thus tardily finds its way into the duodenum must be grosser and more viscid than in a healthy state; and hence another cause of retardation and irregular supply. There is also a change in the colour as well as in the consistency of the bile frequently to be met with in the chronic state of the disease; which may sometimes be the result of a morbid secretion, but is perhaps more generally that of a chemical decomposition, from the joint influence of decay and animal heat. And, under these circumstances, the bile has at different times, and in different persons, been found acid, acrid, saltish, insipid, whitish, black, green, eruginous, and versicoloured. It has been found as dense and dark as elder-rob;* as tenacious and limpid as the white of eggs;† and as crowded and granular as the spawn of frogs.‡

GEN. I.
SPEC. III.
Icterus
spasmodicus.

Changes
hereby pro-
duced in
the bile.

In this chronic form, jaundice has sometimes run on for a long period of time, occasionally for a twelvemonth. It has alternated itself with intermittents; proved a salutary crisis to fevers; or has itself been carried off by exanthems of the more violent kind; and especially by miliary and scarlet fever. The general functions, when it has assumed this form, and the constitution has become habituated to it, are sometimes so little disturbed, that we see people of the middling and lower ranks of life, who cannot afford to keep at home, and who would certainly be the worse for it if they could, going about the streets with the jaundice hue covering their hands and faces, and not prevented from engaging in any of the ordinary concerns of life in which no great degree of exertion is required.

Often of
long con-
tinuance :

without
serious mis-
chief.

In the treatment of this species, emetics and cathartics, so highly beneficial in *icterus cholæus*, are of doubtful advantage. When, however, the bowels are particularly costive, or there is reason to suspect the lodgment of a small calculus, or of any inspissated bile in the biliary duct, purgatives are indicated in the first case; and both purgatives and emetics in the last. But, in all other examples, they must add to the disease by increasing the irritation, and should give way to blood-letting, if the patient be in vigorous health, succeeded by opiates, the warm bath, or warm and anodyne fomentations applied to the epigastrium. Frank, indeed, disapproves of venesection, as well as emetics and purgatives; contending that all evacuations and depletions are not only useless but hurtful. The opiate should be given in pills, for the stomach will often reject liquids of every kind. Two or three grains of the extract of opium may be tried at first, and if this be insufficient, the same or even a larger dose should be repeated half an hour afterwards, and continued till the pain abates. Blistering the seat of pain has been advised by many; and I have often tried it, but without any decided effect. If useful at all, it is rather in preventing a return of the paroxysm, than in shortening or mitigating it when pre-

Therapeutic
process.

Emetics and
cathartics,
how far
useful.

Venesection.

Opium in
pills.

Blisters
mostly in-
efficacious.

* Eph. Nat. Cur. Dec. iii. Ann. iv. Obs. 86. † Stoerck, Ann. Med. i. 124. ‡ Eph. Nat. Cur. Dec. ii. Ann. ix. Obs. 9.

GEN. I. sent ; and will hence be most advantageously resorted to in the
SPEC. III. interval.

Icterus
spasmodicus.
Tartar
emetic oint-
ment. The ointment of tartarized antimony, so warmly recommend-
ed by Dr. Jenner, has a much fairer chance of success ; and, in
the author's practice, has at times effected a cure where other
means had been found useless. A portion of the ointment, equal
in size to a hazel-nut, should be rubbed every night into the
epigastric region, till the ordinary eruption appears.

The general soreness upon pressure, and the excitement of
the hepatic absorbents, as already observed, continue very fre-
quently for several weeks after the spasm itself has subsided ;
and, consequently, there will be great languor, indisposition to
labour, and a tawny skin.

General
regimen. For all this, a generous diet, cheerful company, and moderate
exercise, and especially riding on horseback, go very far to-
wards effecting a cure ; and perhaps farther than any course of
medicine whatever. The bowels, however, must be kept open
with warm aperients, and the stomach and abdominal viscera
invigorated by bitter tonics.

Dandelion. The dandelion (*leontodon taraxacum*, Linn.) has been highly
extolled by many writers of established reputation in all ob-
structions of the liver, and, indeed, in obstructions generally ;
and has been used in its roots, stalks, and leaves. All these
abound with a milky, bitterish juice, which was at first suppos-
ed to be saponaceous, and hence warmly commended as a re-
solvent by Boerhaave. Bergius, Murray, and Dr. Pemberton
have since contributed to support this character, and they are
consequently in daily use even in the present day. The plant
has no doubt, therefore, deobstruent virtues ; but it has not fal-
len to my lot, though I have many times given it a fair trial, to
add my suffrage in its favour. Its most obvious character is
that of increasing the flow of urine.

Soap and
alkalies do
not act as
solvents ; Soap and alkalies, however, seem to have much better preten-
sions to favour ; and have been still more widely employed in this
disease, and pretty extensively regarded as general, and hence
as hepatic solvents. Yet, that they do not act as solvents in he-
patic cases, is clear from a striking instance related by Dr. He-
berden, who tells us that he once attended a person, who, for a
stone in the urinary bladder, had been in the habit of swallow-
ing an ounce of soap every day for seven years. His body was
opened after his death ; and notwithstanding such an extraordi-
nary quantity of soap had been taken, a great number of stones
were found in the gall-bladder, without the slightest marks of
having been operated upon by any decomposing power.*

yet useful as
substitutes
for bile ; Soap, however, and other alkaline preparations may, perhaps,
be useful in another respect : I mean, in becoming a substitute
for the deficient bile, and cleansing the bowels by their possess-
ing something of the same chemical properties. Yet too much
stress must not be laid even upon this virtue ; for large quanti-
ties of acids, as lemon-juice, have at times been taken with so

* Medical Transactions, vol. ii. p. 165.

much apparent benefit, as to gain, also, the credit of a cure. There is one drawback against whatever may be the remedial powers either of soap or of the alkalies; and that is their frequent and easy decomposition in the stomach, in consequence of its containing at all times some quantity, and occasionally a very large proportion, of acidity. We may often, perhaps, introduce so much of these medicines as shall be more than sufficient to neutralize the acid; but where a large quantity is wanted for this purpose, it is better to employ the alkali alone than combined with oil, as less troublesome to the stomach. And where this is done, the best, because the most manageable, preparation of the alkalies, will be that which is the purest and most concentrated, as the liquid potassæ; nor does it appear, that the other alkalies would answer better if we had forms for elaborating them in the same manner. The Cheltenham spring has unquestionably been serviceable in the relics or sequelæ of the disease, and where exercise and a tonic plan are decidedly indicated. But where we have reason to believe, that the bile is secreted in a depraved condition, and particularly where the disease is connected with a morbid state of the liver, the Bath waters, used both internally and externally at the same time, will be found more beneficial than those of Cheltenham.

GEN. I.
SPEC. III.
Icterus
spasmodicus.
but often
too easily
decomposed
in the sto-
mach.

Cheltenham
water.

Bath water.

Another remedy to be spoken of, which of late years has excited great attention, is the diluted aqua regia bath, invented by the late Dr. Scott. For nearly thirty years, he was in the habit of using this preparation, and had tried it in almost every variety of strength, and almost every variety of proportion, which the two acids that enter into the composition may be made to bear to each other. He commenced his experiments in India, where, on account of the greater degree of torpitude the liver is apt to acquire than in more temperate climates, he was in the habit of forming his bath stronger and making it deeper than he found it proper to do in our own country: and where, upwards of twenty years ago, he plunged the Duke of Wellington into one up to his chin, for a severe hepatic affection he was then labouring under, and thus restored him to health in a short time.

Scott's aqua
regia bath.

How em-
ployed in
India.

In England it was not often, that he found it necessary to raise the bath much above the knees, and frequently contented himself with a mere foot-bath or common wash-hand basin alone. In both which cases, however, the attendants on the patient should sponge him at the same time with the diluted aqua regia, over the limbs, and occasionally over the body.

How in
England.

The aqua regia should be compounded of three parts in measure of muriatic acid and two of nitric acid; and in preparing them for use, a pint of the combined acid is to be mixed with the same measure of water. This constitutes the diluted acid, or diluted aqua regia. The acid bath is to consist of three ounces of this diluted acid to every gallon of water. It should, however, be observed by those who are inclined to form this mixture extemporaneously at their own houses, that, if either of the acids be poured immediately on the other, a large volume

Proportion
of the acids.

GEN. I.
SPEC. III.

Icterus
spasmodi-
cus.

Measure of
its strength.

of very offensive gas will be disengaged; on which account, it will be better to pour them separately and slowly on their proper measure of water.

If the acids be of adequate strength, the mixture subdiluted for bathing will, to the taste, have the sourness of weak vinegar, and, perhaps, prick the skin slightly, and excite a peculiar rash, if very delicate, but rarely otherwise, after it has been applied to the surface for half an hour. But since these acids vary much in their degree of concentration, as distilled by different chemists, there will be some variation in their power. The strength of the bath, however, should not be much greater at any time, than the proportion here laid down; for otherwise it may excite a troublesome rash, and give a yellow hue to the nails and skin of the feet, or whatever other part is exposed to its action. A narrow tub for a knee-bath, just wide enough to hold the feet and reach the knees, should contain three gallons of the prepared bath liquor, and consequently about nine ounces in measure of the diluted aqua regia. For a foot-bath, half a gallon may be sufficient, and a common wash-hand basin may be employed as a vessel for the purpose. The feet should remain in the bath for twenty minutes or half an hour: and the legs, thighs, and abdomen be, in the mean time, frequently sponged with the same. In the winter, the water may be used warm: but this is not necessary in the summer. The bath may be employed at first daily for a fortnight or three weeks, and afterwards every other day or only twice a-week.

Dr. Scott affirms, that he has employed this process with decided advantage in almost all cases dependent on a morbid secretion of bile; whether the secretion be superabundant, defective, or depraved. He finds it often, within a few hours of the first bathing, increase the flow of bile and meliorate its character; and, in consequence hereof, excite an expulsion of dark-coloured feces, bright-coloured bile, or bile of a brown, green, or black colour, like tar mixed with oil. He has told me also, that, when employed in the midst of a paroxysm of severe pain from spasm of the biliary ducts, or the passing of a gall-stone, he has often known it to operate like a charm, and produce almost immediate ease.*

From the rapidity, therefore, with which it acts in some cases, he is inclined to think, that it operates, not by the absorbents, but by the nerves: and has made various experiments to show, that it is the chlorine of the muriatic acid alone, by the present process decomposed and set at liberty, that produces the benefit of the bath. To prove this, he employed a bath of water saturated with chlorine, obtained from the muriatic acid by mixing it in a retort with the black oxyde of manganese: and the same salutary effects followed: and he has given this saturated solution in doses of half or three quarters of an ounce, three or four times a-day, mixed with the same quantity of spearmint, or any other distilled water, with evident benefit, in very numerous hepatic cases of great obstinacy.

* See also Med. Chir. Trans. vol. viii.

Has been
found useful
in all cases
of morbid
bile.

In what
manner it
acts.

This account may be rather overcharged, from the ardent mind of its intelligent inventor: but the process is worth following up, and varying in other proportions, as well as employing in other families of diseases. My own use of it is at present too limited to speak with decision; yet, so far as I have tried it, it has certainly appeared to me to allay irritation and produce a tonic effect. In two or three instances, the advantage has been decisive; and patients, who had hitherto been seldom two months without a severe return of the complaint, have entirely escaped, and apparently lost the morbid predisposition. In a few other cases, it has completely failed.

It is now, however, in a course of experiment in the hands of several intelligent practitioners, and we may hope soon to be put into possession of its actual powers. Mr. Wallace has been employing it in the form of gas, obtained by a mixture of muriatic acid with the black oxide of manganese, as well as diluted with aqueous vapour; and he regards the peculiar eruption as a favourable sign.*

GEN. I.
SPEC. III.
Icterus
spasmodi-
cus.
The state-
ment proba-
bly over-
charged.

But now in
a course of
determina-
tion by
other ex-
periments.

SPECIES IV. Icterus Hepaticus.—*Hepatic Jaundice.*

The course of the Bile obstructed by a derangement of the Liver from scirrhus or other indurations; occasional retchings and dyspepsy: little or no pain in the right hypochondrium.

IN the preceding species, the appendages to the liver, as the gall-bladder or gall ducts, are the chief seat of disease, at least in its commencement. In the species before us, the disease is chiefly seated in the liver itself. It may be a result of the preceding species when they have assumed a chronic form; but, as the liver itself is often affected from the first, it is entitled to be treated of as a distinct species. The course of the bile, indeed, is evidently obstructed, but rather in its secretion or separation from the substance of the liver, than in its transmission by the biliary tubes.

Seat of the
disease.

This species is noticed by Boerhaave, by Sauvages, and by Dr. Cullen in his Synopsis, though he has offered no remarks on it in his First Lines. In Boerhaave, however, it imports altogether a different disease, for it is jaundice produced by hepatitis,† or inflammation of the liver; and is hence a mere symptom, to be removed alone by a removal of the idiopathic complaint.

This species
different as
described
by different
writers.

It is more accurately described by Richter, who confirms and illustrates the opinion of Vogel and Selle; both of whom suppose it to depend upon some peculiar irritation in the liver itself; or in the whole hepatic system; but an irritation not dependent upon or directly leading to inflammation. This irritation is of various kinds, and produces different effects, all of

Supposed
proximate
causes.

* Researches respecting the medical Powers of Chlorine, particularly in Diseases of the Liver, &c. by W. Wallace, M.R.I.A. London, 1822.

† Van Swiet. Comment. Hepatitis et Icterus multiplex, tom. iii. § 914.

GEN. I.
SPEC. IV.
Icterus
hepaticus.

which become causes of obstruction to a free flow of the bile into its proper channels. One of the most common effects, which operate in this manner, is a scirrhus enlargement of the whole, or of some particular part, of the liver. Another is an accumulation of calculous concretions, in its substance; of which Richter gives a striking and complicated example in a person, who, after death, was found to be without a gall-bladder, and whose liver was filled with whitish calculi of different forms and sizes, from that of a pea to that of a cherry. In this case there can be no question, that the bile, whose colouring matter was diffused over the entire body, was not only formed in, but immediately absorbed from, the penicilli, or pores of the liver, in consequence of obstruction, without being collected into a reservoir.

In what case
accompanied
with danger.

This is the worst state in which jaundice can possibly make its appearance; for, though there is little or no pain, it shows disease in the structure of the liver, and is frequently a mark of a broken-up constitution. It is in fact found rarely in the young and vigorous; but almost always in those who have drunk hard, or lived hard, and especially have been exposed to much labour in hot climates, or have suffered under repeated attacks of quartans or other chronic intermittents.

Medicine of
little avail.

The art of medicine can here do but little; and we have too often to witness the picture, drawn so feelingly of the Athenians during the plague:

—Defessa jacebant
Corpora; mussabat tacito MEDICINA timore.*

Except in
an early
stage of the
disease.
Mercury
how best
employed.

It is only in an early stage of this disease, if happily we should be so soon consulted, that mercury has any chance of being successful; and it should be given rather as an alterant in small doses pertinaciously followed up, than in large proportions so as to excite a ptyalism; for we have here no strength to draw upon without injury. "I think," says Dr. Baillie, "that many practitioners of the present day have erred in administering mercury too long, and in too liberal doses. When mercury is carried beyond the point that is necessary, it often injures the constitution by weakening it, and rendering the nervous system very irritable."† In some cases, small doses of calomel in combination with conium have been serviceable: and I have certainly found benefit from covering the hypochondriac region with a large plaster of the emplastrum hydrargyri cum ammoniaco. For the rest the patient must be put upon a general tonic plan: his diet should be generous without being highly stimulant; he should use such kind of exercise and in such proportion as best agrees with him; and the chalybeate springs, corrected as those of Cheltenham by neutral salts, form the best mineral invigorant to which he can have recourse. Possibly, in this malady also, the diluted aqua regia bath may be of service, employed as recommended under the last species.

General
regimen.

Chalybeate
springs.

Aqua regia
bath.

* Lucr. De Rer. Nat. vi. 1176.

† Lectures and Observations on Medicine, 1825. Unpublished.

[In that state of the liver which produces jaundice towards the end of intermittent fevers, mercury is the best and only remedy; and calomel, in small doses, is the form under which it is the most efficient. When jaundice arises from congestion of the vessels of the liver, general blood-letting, or (if the patient's reduced state prohibit it) local bleeding, by the application of leeches, or cupping-glasses, to the right hypochondrium, will be proper.]

GEN. I.
SPEC. IV.
Icterus
hepaticus.

SPECIES V. Icterus Infantum.—Yellow Gum. Jaundice of Infants.

The course of the bile obstructed by viscid meconium; without pain or dyspepsy; easily removed by purgatives.

THIS is the mildest form under which jaundice makes its appearance, and that which is carried off with least trouble. In ordinary cases, the only symptoms are the pathognomic colour, and a degree of languor and drowsiness beyond what is common to infants on birth or shortly after.

A yellow hue, however, on the surface of infants is not necessarily a symptom of jaundice, properly so called; for Lentin,* Cullen, and many others, have well observed, that such a discolouration may also be the result of a peculiar yellowness of the serum of the blood, unconnected with bile;† analogous to the golden tint, which we so frequently find diffusing itself over the surface of a contusion, when the finer and more limpid parts of the effused fluid have been carried off, and the colouring matter of the serum that still remains behind is hereby become more concentrated: as we shall have to notice more at large when treating of this affection under the name of *Aurigo*, constituting the fifth species of the genus EPICHRISIS.‡

Yellow hue
not necessarily a
symptom of
jaundice.

A dose of castor-oil, or any other active purgative, will generally be sufficient to remove the obstruction, which in almost every instance proceeds from meconium more than ordinarily tenacious, and consequently will carry off the disease. But frequently the mouth of the ductus choledochus communis is so completely infarcted with this viscid matter that purgatives are insufficient; and, in this case, an emetic should be given, and in a few days repeated, if necessary.

Treatment.

[Icterus being seldom a disease essentially mortal, and only having, in general, a fatal termination when combined with some serious organic disease, a distinction should be made between persons dying with jaundice, and those dying from it; a distinction first made by the celebrated M. Portal.

Morbid
Anatomy.

The bodies of icteric subjects usually present the same mor-

* See Baume's Description de l'Ictere des nouveaux nés, &c. Nîmes, 1788—Cull. Synops. Nosol. Gen. xci. 5. note.

† Müller, Dis. de Origine Icteri, maximè ejus, qui infantes recens natos occupat. Jen. 1788. ‡ Cl. vi. Ord. iii. Gen. x.

GEN. I.
SPEC. V.
Icterus.
Morbid
anatomy.

bid colour which they exhibited in life. However, according to M. Portal, the intensity of the colour is sometimes diminished; while some bodies, which never showed any marks of jaundice previously to death, afterwards turn of a very deep yellow. A tendency to anasarca is generally noticed, and, when incisions are made in the cellular membrane, a good deal of serum, which is of a more or less yellow hue, flows out. Whatever fluid is found in the ventricles of the brain, or in the chest, or abdomen, is likewise either of that colour, or reddish. In short, every texture, and even the most compact parts, present a yellow tinge; as the fat, the muscles (which with other organs are softened), the membranes, especially the serous ones; the lining of the arterial system; the tendons; the cartilages; the periosteum; and the very bones.

State of
the lungs,
heart, &c.

According to Morgagni, the lungs, heart, liver, spleen, and kidneys are softened, their texture containing a limpid yellow or reddish fluid. Most of the secretions partake of the same tinge.

Of the liver.

No part, however, is more frequently affected in jaundiced subjects, than the liver. Sometimes dissection demonstrates it to be either in a state of chronic inflammation, or of preternatural volume or smallness, or converted into a fatty matter resembling tallow. Abscesses, ulceration, biliary concretions within its substance, and numerous close adhesions of it to the neighbouring parts, are likewise occasionally discovered after death.

Gall-
bladder.

The state, in which the gall-bladder is found, is extremely diversified: very often it contains calculi, of which there may be only one or many. The single one is occasionally very large; the numerous ones, sometimes amounting to hundreds, are usually of diminutive size. At the same time, the gall-bladder may contain no bile, or be prodigiously distended with it. Van Swieten speaks of a case, in which the gall-bladder reached from the liver to the crista of the ilium, and had more than a pint of bile in it. In some cases, this fluid has been found viscid, almost black, and to contain gritty particles like sand. In Dr. Bright's recent publication,* Dr. Bostock has given the analysis of the fluid of the gall-bladder in a case of protracted jaundice, accompanying tubercular liver and dropsy. It had an orange colour, and thin consistence; the animal matter in it was almost entirely albumen, with a little colouring matter different from that of the bile; and, in fact, it contained none of the usual biliary principles. In particular examples, the gall-bladder exhibits traces of the effects of inflammation, its coats being thickened and indurated. In one instance, Bonnet found excrescences within its cavity.† Sometimes the gall-bladder is adherent to the neighbouring organs. In one patient, who died with jaundice, the gall-bladder and cystic duct were altogether wanting.‡

At various points of their course, the hepatic, cystic, and

* Reports of Medical Cases, 4to. London, 1827. † De Ictero, Obs. 13.

‡ F. T. M. Bourgeoise, De l'Ictère. 4to. Paris, 1814.

common biliary ducts frequently contain calculi of different sizes. When these concretions lodge either in the hepatic or common duct, they completely block it up; and hence it is often found considerably dilated above the obstruction, and containing a large quantity of bile; a circumstance that does not occur when the foreign body lodges in the cystic duct. Sometimes these several canals are so contracted, that a small probe cannot be introduced into them. Stoll met with the common duct in what he calls a cartilaginous state. Cabrolus has recorded a case of jaundice, in which there was a malformation of the common duct, its end towards the liver being very wide, and its communication with the bowels as minute as the extremity of a capillary vessel. Lastly, the biliary ducts are often found compressed, and even more or less obliterated by various kinds of tumours formed in their vicinity. A most remarkable enlargement of the biliary ducts, in consequence of the pressure of a scirrhus pancreas on the common duct, is recorded by Mr. Todd. After death more than a quart of bile was found in them. The patient's face is represented to have been quite of an orange colour.*

GEN. I.
SPEC. V.
Icterus.
Morbid
Anatomy.
State of the
biliary
ducts.

When the common duct is rendered completely impervious by the lodgment of a calculus, and yet no jaundice takes place (a fact that has sometimes been noticed), the possibility of the existence of a second biliary duct has been suggested as an explanation of the circumstance. This preternatural arrangement is even admitted as possible, both by Morgagni and Portal, whose statements rest upon several cases, in which it had been traced.

In some individuals, who had been free drinkers, and died with jaundice, Stoll found the pylorus contracted, and a considerable portion of the stomach hard and almost cartilaginous.†

Stomach.

Sometimes the duodenum around the termination of the common duct has been found scirrhus and ulcerated.

In other instances, dissections prove, that the compression of the biliary passages is the result of disease and enlargement of the pancreas or spleen. A case of black jaundice is recorded by Zacutus Lusitanus as having taken place in a person, in whom the spleen was entirely wanting.

Duodenum.

Pancreas
and spleen.

Sometimes the vena portæ has been observed to be very considerably enlarged, not merely in its trunk, but its ramifications. Any cause, producing an obstruction of the circulation in this vessel, may give rise to a species of jaundice, very difficult of cure. In one subject, which was opened by M. Honoré, the vena portæ was almost impervious, in consequence of a tumour formed in its parietes. The patient had been afflicted with jaundice, and the stomach was cancerous.‡

Vena portæ.

Amongst other causes of jaundice, dissection, as well as clinical experience, proves, that collections of fluid in the abdomen, and abscesses of the liver, deserve to be particularly mentioned.

Dropsy, &c.

* Dublin Hospital Reports, vol. i. p. 325. † Ratio Medendi, pars tert.

‡ Archiv. Gén. de Méd. Septembre 1823.

GEN. I.
SPEC. V.

Icterus.

Morbid
anatomy.

Heart and
lungs.

Jaundice is not an uncommon attendant also on organic diseases of the heart and lungs.

In general, the foregoing morbid appearances do not exist singly, but several occur together.

Though the above account corresponds to what is commonly established by dissection, it is curious, that sometimes all the foregoing morbid changes exist, unaccompanied by the slightest degree of jaundice. And sometimes jaundice prevails in subjects, in whom no organic disease whatever can be traced after death. Here Hoffmann and Morgagni have recourse to the suspicion of spasm of the biliary ducts, which became relaxed after death.]

GENUS II. MELÆNA.—MELENA.

The colour of the eyes and skin yellow-green, fuliginous, leaden, or livid; the dejections pale, occasionally dark-coloured; anxiety; depression of spirits.

How named
by the
Greeks and
Latins.

This is the Melæna, or *Μελαινα γυνος* of the Greeks: a name given to it by Hippocrates, who has been followed up by the Latin writers; among whom, with a mere translation of the term, it is called MORBUS NIGER, or the *Black-disease*, whence the name of BLACK-JAUNDICE in our own country and on the continent.

Colour of
the skin
varies.

The colour of the skin under this disease is always dark, but differs considerably in its shades, and even in its hue, in different individuals.* It sometimes approaches to a green; whence by Forestus, Razouz,† and other writers, it has been called icteritia or icterus *viridis*; on which account, it has of late been described under the name of *Green-Jaundice* by Dr. Baillie.

Varieties
of the bile.

This versatility of colour is not to be wondered at; for I have already had occasion to observe, that the bile, under different states of a diseased liver or its appendages, exhibits very different appearances. In respect to consistency, it has sometimes been found watery,‡ viscid, or flaky; in respect to colour, green,§ muddy, pale-white,|| pitchy-black, eruginous,¶ and versicoloured; in respect to internal properties, insipid, salt, acid, or acrid and effervescent. In the disease before us, it is always of a dark, and often of a black or pitchy hue. The stools, as in the preceding species, are generally pale from obstruction; and the urine, also, is sometimes pale, and generally clear.

Bile here al-
ways dark
or black.

Not noticed
distinctly
by Cullen.

Dr. Cullen seems to have been doubtful how to dispose of the genus MELÆNA. In his Synopsis, he has omitted it altogether: in his First Lines, he has briefly noticed it, first under hæmatemesis, and again under diarrhœa, as though melæna were a variety of both these. But not satisfied with this distribution, he

* Lib. xiii. Obs. 23. † Tables Nosologiques, p. 129. ‡ Bianchi. Hist. Hep. p. 129. Sebez. Exercit. Med. p. 93. § Augen. Hor. tom. i. lib. xi. ap. 5. || Eph. Nat. Cur. Dec. i. Ann. iv. Obs. 194.—Cent. iii. ix. App. 9. ¶ Stoll, Rat. Med. part i. p. 292.

afterwards introduced it into his "Catalogue of Diseases omitted, but which ought not to have been omitted" in his Nosology.

GEN. II.
Melæna.

With these occasional dejections of viscid and pitchy bile, and sometimes even without them, there is also frequently a discharge of dark grumous chocolate coloured blood, accompanied with, or preceded by, a considerable pain in both hypochondria.

Sometimes accompanied with chocolate-coloured and grumous blood.

[Our author adopted Hoffman's belief, that, in melæna, the liver and spleen were diseased, and their blood-vessels ruptured. Dissections do not prove the constancy of these circumstances. Dr. Cheyne has known two instances, in which inky blood was vomited up, in consequence of long-continued sea-sickness, where no reason existed for suspecting tumour, or obstruction in any of the solid viscera of the abdomen; facts, proving in his opinion, that melæna may depend solely upon an excitement of the inner surface of the stomach. In Dr. Markland's case, the liver was smaller than usual, and had a rough shrivelled appearance, with fissures one eighth of an inch in depth. It contained neither blood nor bile, and was of a natural consistence. The spleen contained little blood, but was of the natural size and appearance.* In the third case, recorded by Portal,† no visceral disease was discovered after death; however, in two other examples described by him, the liver and spleen were diseased. They were also found diseased, as well as the stomach and small intestines, in a case published by Dr. Cheyne,‡ who particularly mentions, that the vessels of the liver and spleen appeared to be destitute of blood. In a curious example of sixteen pounds of melæna, found in the colon by Mr. Geoghegan, there were tubercles of the liver, and a stricture of the rectum.§]

Dissections.

The above symptoms have been accurately distinguished by Hippocrates, who in consequence hereof has noticed the two following species of the disease, which I have copied with little variation into our Nosological Synopsis, as forming the best arrangement, and giving the best view of melæna that I am acquainted with.

- | | |
|-------------------|-----------------|
| 1. MELÆNA CHOLEA. | BLACK JAUNDICE. |
| | GREEN JAUNDICE. |
| 2. ——— CRUENTA. | BLACK VOMIT. |

SPECIES I. Melæna Cholæa.—*Black Jaundice. Green Jaundice.*

Occasional dejections of dark or pitchy bile, intermixed with the feces; occasional vomitings of yellowish-green and acid colluvies; great languor; often vertigo; hypochondria free from pain, but tender upon pressure.

THE liver is here generally diseased in its structure, and a Pathology.

* See Edinb. Med. Journ. No. 79, p. 301. † Mem. sur la Nature, &c. de plusieurs Maladies, tom. ii. Paris, 1808. ‡ Dublin Hospital Reports, vol. i. p. 263. § Trans. of the Assoc. Physicians of Ireland, vol. i. p. 197.

GEN. II. morbid deep-coloured bile, fulvous, greenish, or fuliginous, is
 SPEC. I. discerned, instead of the natural excretion; the finer part of the
 fluid is first absorbed, and afterwards the grosser; and what re-
 Melæna mains becomes still more viscid, more stagnant, and of a deeper
 cholæa. hue.

Incorrectly supposed to be a mere aggravation of yellow jaundice. "In the ordinary use of the term," observes Dr. Marcard of Hanover, "black jaundice means nothing more than yellow jaundice of a more than usually deep dye: yet when the real disease exists to which this name ought to be limited, no practitioner, who closely examines the very dark colour of the skin and of the defluxions, and especially the danger that accompanies it, can avoid concluding that it has something peculiar in its nature, and cannot be merely an intense degree of yellow jaundice. It is highly probable," he continues, "that a part of the dark colour may depend upon the hue of the bile itself in a state of morbid secretion; but along with this there is also a very great structural decay in the biliary organs as well; a decay, which gives the chief character to the disease; prevents so frequently all beneficial effects from the best medical treatment; and consequently renders the disease so often fatal."*

Description. The green jaundice is sometimes to be found in young persons, but far oftener in the middle and more advanced periods of life. In men it occurs more frequently than in women, probably on account of the greater wear and tear of their constitution, as more exposed to all weathers and all climates; and appears to be less connected with intemperance than the yellow jaundice; and less disposed to terminate in abdominal dropsy.

Liver often enlarged throughout. In many instances, the hardness and enlargement of the liver extend through its entire structure, but are perhaps more frequently confined to some particular part of it. Upon pressing the region of the liver, the patient is commonly sensible of some degree of tenderness, but otherwise he feels no pain whatever; though he has the same distressing itching of the skin which I have already noticed in yellow jaundice; and sometimes a troublesome sensation of heat in the palms of the hands and soles of the feet.

Pulse natural or slow. The pulse, as observed by Dr. Baillie, continues "natural both with respect to strength and frequency, unless some circumstance may have occurred to irritate the constitution for the time." In the more striking cases, however, that have occurred to myself, the pulse has been peculiarly slow, in some instances not amounting at any time to more than fifty beats in a minute, and occasionally to not more than thirty. The stools are generally pale; but from some irregular excitement of the liver, they appear sometimes tinged with bile of a peculiarly dark and pitchy hue; a part of which, from its overflow, rushes into the stomach, and is discharged by the mouth. The urine is deeply loaded with the same, and tinges the linen of a dark tawny hue; it flows freely, and sometimes deposits a pinky sediment.

* Medicinische Versuche, &c. Leipsic, 8vo. 1779.

The appetite varies, not only in different persons, but even in the same. Some patients eat with a pretty good habitual inclination. In others, the stomach is extremely capricious; at one time without any desire for food of any kind, at another only relishing particular kinds; and perhaps a few days afterwards evincing a general taste for whatever is introduced upon the table.

GEN. II.
SPEC. I.
Melæna
cholæra.
Appetite.

In the preceding species, jaundice is not a dangerous disease, except where the substance of the liver is very generally affected, so as to make an approach to the species before us. In green jaundice the patient rarely recovers. The progress of the disease is always slow, and the patient may labour under it for three, four, five, or even seven years. I have lately lost a patient, who had suffered under it for this last term of time, and was not more than forty-two at his death. He was a captain in the royal navy, of regular habits, who had seen hard service, and been severely tried by a change of climates.

Prognostics.

Contrary to what occurs in all the modes of yellow jaundice, the morbid hue is here so deeply rooted in the system that it never quits it. If the patient recover, it may become a few shades lighter, but it never leaves his person altogether, and is always visible in the countenance.

Morbid hue
never quits
the skin
even on re-
covery.

When the pulse has been very slow, I have commonly found it connected with some affection of the head, and particularly apoplectic or epileptic fits.

Sometimes
productive
of apoplexy
or epilepsy.

As there is much obscurity in this disease, its medical treatment is indecisive. Mercurial preparations, which so often aid us in the first species, are rarely of service in the present. Dr. Baillie thinks he has found neutral salts, taken daily as an aperient, of palliative use; but of a radical cure he seems altogether to despair. It has appeared to me, that, though mercury fails when employed alone, combined with antimonials it is often highly beneficial; and of all preparations of this kind, I have by far preferred the form of Plummer's pill, or, in other words, the submuriate of mercury in union with the precipitated sulphuret of antimony, with a warm stimulant of gum-resin. I have also found unquestionable benefit from an union of alkalies and bitter tonics; particularly the liquor potassæ with infusion of columbo. The aqua regia bath is another tonic well worth trying. I think I have found it serviceable, but have not yet employed it on a scale that enables me to speak peremptorily. Here also, as in spasmodic jaundice, the counter irritation of the tartar-emetic ointment has occasionally proved highly beneficial. [A medicine, now found to be highly worthy of trial in all cases of melæna, is the rectified oil of turpentine, as recommended by Mr. Adair.*]

Medical
treatment
indecisive.

Neutral
salts some-
times palli-
ate.

Plummer's
pill some-
times radi-
cally useful.

Alkalies
and bitter
tonics.

Aqua regia
bath.

Tartar-
emetic
ointment.

* Medical Facts and Obs. vol. iv.

SPECIES II. *Melæna Cruenta*.—*Black Vomit*.

Occasional vomitings and dejections of grumous blood, intermixed with dark-coloured bile; pungent, tensive pain in both hypochondria; compressive pain at the pit of the stomach and fainting.

GEN. II.
SPEC. II.

Melæna cruenta.
Complicated of the preceding species and passive hemorrhage from the vessels of the liver, spleen, or both; sometimes from those of the stomach.

Little as we know of the exact part performed in the animal economy by these organs, we see enough to convince us, that the functions of the liver and of the spleen are intimately connected; the blood in both is highly carbonated, as even the natural colour sufficiently indicates; and the closest alliance subsists between them. On which account Hippocrates calls the spleen the *left*, and Aristotle the *bastard* liver. It is a singular property of the blood of the spleen, that, like the catamenial discharge, it does not coagulate.

Dr. Home took a like view of this disease: and affirmed it to be produced, not by a mere effusion of bile of a darker colour, as in black or yellow jaundice, but by an effusion of blood also, which, however, he imagined to proceed from the meseraic veins. He relates three cases, in which the disease appeared to be carried off by a critical discharge; the first by a diarrhœa, and the other two by an efflux of sweat and thick urine.

[The editor conceives, that the preceding observations require some comment. The doctrine that the disease is invariably connected with a morbid change of the liver and spleen has been already refuted by a reference to dissections performed by M. Portal and Dr. Markland. The hypothesis also of ruptured vessels in these organs being the source of the blood in the intestinal canal, is very repugnant both to the plain truths of anatomy, and to the facts disclosed by the dissection of persons carried off by the complaint. According to Portal, three kinds of matter are vomited up in *melæna*; blood not changed; blood so changed as not to be recognised; and bile, which may also be of a deep black colour.* When the stools are inodorous, and present a yellow colour if diluted with water, Dr. Brooks sets down the case as a bilious *melæna*, in opposition to the sanguineous.† Anciently the liver was fancied to secrete a yellow, and the spleen a black, bile; and the inky matter, which is sometimes vomited up, or discharged by stool, was supposed to pass from the spleen into the stomach through the *vasa brevia*. Dr. Home and M. Portal, however, have proved, that the black matter may transude from the minute arteries of the inner surface of the stomach and intestines; and that it frequently is

Disease how explained by Dr. Home.

* *Mém. sur la Nature des plusieurs Maladies*, 8vo. Paris, 1808.

† See *Trans. of Assoc. Physicians of Ireland*, vol. i. p. 148.

nothing more, than blood altered from its natural appearance by some peculiar action of the vessels.] GEN. II. SPEC. II.

Dr. Baillie has, in a few cases, found this cocoa-like fluid thrown up in great abundance, where the stomach alone has seemed to him to have been solely affected, and the liver to have been apparently unconnected with it, though he admits the concurrent action of both viscera in other cases. But, in these special instances, there has been a peculiar obscurity or uncertainty, which is sufficient to justify us in not placing much reliance upon them. In certain cases, Dr. Baillie tells us, the patients were in some months restored to tolerable health: and here it is difficult to speak with precision as to the extent of the disease. In one case this distinguished practitioner tells us the stomach was examined after death; it appeared very capacious; but no structural disease, "SO FAR AS HE RECOLLECTS," was found either in the stomach, the liver, or the spleen.*

Melæna cruenta.

Intemperance, but especially habitual dram-drinking, is the common cause. Besides the symptoms noticed in the definition, it may be observed, that the countenance is chlorotic, and usually full of anxiety; the pulse is quick and feeble; skin hot and dry; the strength greatly impaired. Symptoms.

As a symptom, this disease is met with in severe attacks of dysentery; but more frequently in severe attacks of yellow fever, and especially that variety or stage of it which by some writers has been distinguished, though perhaps unnecessarily, by the name of Bulam fever. In this case, the black matter is often formed in a few hours, and at once thrown in great abundance from the stomach before it has time to be absorbed and enter into the circulation, so as to produce the true atrabilious tinge upon the skin, which distinguishes the idiopathic malady. Found as a symptom in yellow fever.

In the case described by Dr. Markland, the whole line of the intestinal canal, in its villous coat, appears, on dissection, to have been more or less gangrenous: and half a pint of black grumous blood was found in the stomach. The liver, as already noticed, was of a pale brown colour, smaller than usual, with a shrivelled fissured surface, without either blood or bile. Symptoms chiefly seated in the intestinal canal.

In so worn out and exhausted a state of the affected organs, or perhaps of the constitution generally, as this disease indicates, little benefit is to be expected from medical treatment. Medical treatment.

Our first duty, however, is to clear the impeded passages of the grumous matter that obstructs them; and our next, to prevent as much as possible a fresh flow of it. For the former, gentle means, whether in the shape of purgatives or emetics, or both, will answer best; as we have a shattered fabric to work upon, and violence will only add to its weakness. For the second purpose, the alkalies have very generally been had recourse to, sometimes alone, and sometimes in the form of soap: but I have rarely found them of decided benefit. For these I have often substituted acids, and have preferred the vegetable to the min-

Obstructed passages to be cleared.

Fresh flow to be prevented.

Acids preferable to alkalies, especially vegetable.

* Lectures and Observations on Medicine. Posthumous, 8vo. Printed for Taylor, 1825.

GEN. II. eral, particularly where the constitution has appeared to be
SPEC. II. broken down generally; as the patient is able to take a much
Melæna larger proportion of the former than of the latter, because of
cruenta. the corrosive quality which the latter possess: and of the vegetable acids, the fermented or acetous have answered better than the native. Mercurials seem to be of as little service as in the preceding species; except where we have reason to expect a fresh accumulation of the morbid material, in which case they may be employed as a purgative. But, between the paroxysms, bitter tonics, as columbo and simarouba, with such gentle exercise as may be engaged in without fatigue, a light but generous diet, and the use of the Cheltenham waters, are what should chiefly be insisted upon, as best calculated to postpone the fatal issue.

Mercurials
of little
avail.

Bitter
tonics.

Turpentine.

[Our author conceived melæna cruenta to be a hopeless case, and, when the liver and other viscera are much diseased, the prognosis must certainly be very unfavourable. It is rather extraordinary, however, that he should not have noticed the efficacy of the oil of turpentine in this disease. Besides the observations of Mr. Adam and other practitioners in its favour, two cases of melæna cruenta cured by it, are recorded by Dr. Brooks,* and another by Dr. W. Nicholl.† The latter prescribed it as follows: *R.* Ol. terebinth. 3ss. syr. papav. alb. 3j. aq. menth. vir. 3j. This draught was given five or six times in the first twenty-four hours, and the annexed clyster twice. *R.* Ol. terebinth. 3j. mucil. acaciæ, 3iss. decoct. avenæ, 3xii. Afterwards twenty drops of turpentine with four black drops were given every four hours, and five grains of the blue pill at night.]

GENUS III. CHOLOLITHUS.—GALL-STONE.

Pain about the region of the liver catenating with pain at the pit of the stomach; the pulse unchanged; sickness; dyspepsy; inactivity; bilious concretion in the gall-bladder or bile-ducts.

In the preceding species we have had occasion to observe, that the bile is frequently found peculiarly viscid or tenacious, either from original secretion in this state, or from an absorption of its finer and more attenuate parts in the gall-bladder or appended ducts. In the disease before us, we find certain portions of it indurated, and assuming a concrete form, often of a crystallized, sometimes of a laminated structure; and perhaps most commonly of both; evincing a tendency towards crystallized rays in the centre, with concentric laminæ towards the surface.‡

[They have generally been considered as closely resembling spermaceti; are soluble in boiling alcohol; in æther; and also very slowly in oil of turpentine. The substance, like spermaceti, was regarded by Chevreul as a peculiar animal principle, and named by him cholesterine. There is, however, another

* Trans. of Assoc. Physicians of Ireland, vol. i. † Op. cit. vol. iii. p. 274.

‡ Baillie, Morbid. Anatom. Fol. 5, Pl. vi. p. 109—113.

Gall-stones
how formed.

kind of biliary calculus, resembling inspissated bile, but, not like it, soluble in alcohol and water. The two compositions are frequently blended together, forming biliary calculi of intermediate characters.*] GEN. III. Chololithus.

These concretions were supposed by Fourcroy to consist of a resinous matter combined with a peculiar oil, and a certain quantity of albumen, forming three of the constituent principles of bile. All these principles, however, have of late been denied by Berzelius, who has discovered, that the bile becomes resinous only in the process of experiment, by supersaturating it with acids, while the material, hitherto regarded as albumen, is nothing more than a small portion of mucus, furnished from the gall-bladder. Chemical character.

In all instances, perhaps, gall-stones are inflammable; and when dry, blaze like wax in the flame of a candle. And in some instances, Dr. Darwin suspects them to dissolve in the matter of the feces, and to pass away invisibly. It is possible, however, that the cases, here alluded to, were only examples of spasmodic jaundice; for nothing but the actual appearance of bilious concretions in the feces can fully prove their existence; while the general symptoms may be produced by other causes. Gall-stones differ in specific gravity: some have been found heavier than water; others a little lighter, bearing the proportion of nine to ten. In colour they are mostly dark brown; a few are white externally, though still brown within.† Whether soluble in the feces. Specific gravity. Colour.

It is possible, that minute biliary concretions may be occasionally formed in the penicilli, or the pores of the liver, perhaps in the ducts; but the gall-bladder is the common seat of origin: and they are here found of every diversified size, from that of a mustard-seed to that of a pullet's egg; often, indeed, not only completely blocking up the cavity, but distending the bladder far beyond its natural dimensions; and the passing such large concretions shows what wonderful efforts nature is capable of making towards freeing herself from a morbid incumbrance; for the natural size of the ductus communis choledochus scarcely exceeds that of a goose-quill. The change thus occasioned is often very slow; and consequently accompanied with less derangement of the general health than we should expect; but as the bitter of the bile is produced in the cavity of the gall-bladder, and this cavity is hereby generally obliterated, the bile loses a considerable proportion of its bitter taste; and, possibly from the want of bile in the intestines, the evacuations are very irregular. The gall-stone, thus closely impacted, will sometimes remain quiet, and without being detached for many years, with only occasional uneasiness in the hypogastric region. Found of various sizes.

[The circumstances, leading to the formation of gall-stones, are very imperfectly known; but a life of indolence is remarked to bring on a disposition to them. They are much more frequent in women than men, and are chiefly met with in persons who have passed the middle and active period of life.‡] Effects produced on the bile from obstruction of the gall-bladder.

* See Brande's Manual of Chemistry, vol. iii. p. 187. † Heberden, Med. Trans. vol. ii. p. 137. ‡ See Gregory's Elements, p. 488, ed. 2.

GEN. III.
Chololithus.

Course of
gall-stones
into the
intestines.

The ob-
struction
not always
seriously
mischiev-
ous.

Sometimes
mischievous
in various
ways.

"In some patients," says Dr. Heberden, "the jaundice will disappear in two or three days: in others I have seen it continue near a twelvemonth before the gall-stone could pass into the intestine, or fall back into the bladder: nor will this long obstruction of the natural course of the bile have any lasting ill effects, or hinder the patient from being soon reinstated in perfect health after the removal of the obstruction." And as little real inroad upon the constitution takes place, in many instances, from a continuance of the concretion in the gall-bladder: "for many," observes the same excellent writer, "have been opened after their death, in whom a very large stone, or many small ones, have been found, without their ever having had in their lifetime any complaint, which could certainly be imputed to this cause. A gall-stone weighing two drachms was found in the gall-bladder of the late Lord Bute, though he had never complained of the jaundice, nor of any disorder which I could attribute to this cause."*

The irritation of a gall-stone has occasionally excited inflammation, and, where the gall-stone has existed in the liver, a large abscess; and the inflammation in the latter case assuming the adhesive form, the abscess has opened externally, and the calculus been discharged in this direction, of which a curious example is related by Mr. Blagden.† The calculus, on examination, weighed nearly an ounce and a quarter, and was of an oblong shape. The patient, who was a lady of sixty-six years of age, gradually recovered. [Sometimes a biliary calculus of very large size will produce an adhesion of the gall-bladder to the duodenum, followed by ulceration, by which means the foreign body passes into the bowels, and is voided with the stools. A case, satisfactorily exemplifying this fact, is recorded by Mr. Brayne.‡ In other examples, however, biliary calculi of enormous size have made their way into the intestinal canal, through the ductus choledochus, of which instances have been published by Mr. Thomas,§ Dr. Craigie, and others.||]

From the absence or presence of pain, the rest or transit of the gall-bladder, which give rise to a considerable diversity of symptoms, as well as mode of treatment, the genus is divisible into the two following species:—

1. CHOLOLITHUS QUIESCENS.

QUIESCENT GALL-STONES.

2. ————— MEANS.

PASSING GALL-STONES.

SPECIES I. *Chololithus Quiescens*.—*Quiescent Gall-Stone*.

Pain about the liver, and at the pit of the stomach, obtuse and occasional; the bile less bitter than usual; the dejections irregular.

In the quiescent species, the gall-stone remains usually at rest in the gall-bladder or the liver; and, whatever be its size, the

In this species, generally little inconvenience from

* Medical Trans. vol. ii. p. 134. † Op. cit. vol. iv. art. xvi. ‡ Med. Chir. Trans. vol. xii. § Ibid. vol. vi. p. 99. || Edinb. Med. Journ. No. 81.

growth takes place, and the containing organs dilate so gradually as to produce little or no inconvenience. In Dr. Baillie's plates there is an example of a concretion of the size of a pullet's egg, which filled up the whole of the fundus. Yet so perfect was the adaptation of nature to the case, that the bladder not only became sufficiently enlarged at its base to hold the concretion, but was also sufficiently enlarged immediately above it to form a new reservoir, and contain very nearly the usual quantity which the gall-bladder is capable of holding in its healthy state.

At times, however, even in this quiescent form of the disease, we meet with some degree of pain; occasionally, perhaps, produced by a sudden deposite of fresh concrecent matter; occasionally by abrupt starts of some propulsive power which it is difficult to explain; and occasionally by some peculiar and temporary irritation in the coats of the surrounding organ, by which the bowels are apt to be considerably affected.

In this species, however, little medical treatment is necessary: for we have only to correct the cominution of the alvine canal when thus excited, or to quicken its motive power when sluggish; and to have recourse to anodyne fomentations and narcotics internally, if there should at any time be severe pain. And, by palliatives of this kind, many a patient, as I have already observed, has been enabled to possess a comfortable enjoyment of life to old age, whose gall-bladder has, after death, been found loaded with concretions which, there has been good reason to conclude, had been gradually accumulating for thirty or forty years.

[An interesting case of death from inflammation of the gall-bladder, caused by the presence of a biliary calculus, has been published by Dr. Scott,* of Cupar-Fife. On dissection, the coats of the gall-bladder were found to be half an inch in thickness; in its cavity was a stone of about the size and shape of a green olive, with a few ounces of a thin blackish fluid, similar to very black-roasted coffee grounds, or rather to ink diffused through thin mucilage. A similar fluid was vomited up during the patient's indisposition.]

GEN III.
SPEC. I.
Chololithus
quiescens.
the gradual
growth of
the gall-
stone.
Wonderful
adaptation
of nature.
Pain and
irritation
at times.

Medical
treatment.

SPECIES II. Chololithus Means.—*Passing of Gall-Stones.*

Pain at the pit of the stomach acute, extending to the back: frequent vomitings: dejections white; and at length loaded with one or more bilious concretions.

It is not a little singular that, during the great anguish sustained in the transit of a gall-stone, the pulse is rarely or never quickened. "Insomuch," observes Dr. Heberden, "that this natural state of the pulse, joined with the vehement pain about the pit of the stomach, affords the most certain diagnostic of this

Pulse rarely
quickened
in this
species,
whatever
the pain of
the stomach.

* Edinb. Med. Journ. No. 83, p. 297.

GEN. III.
SPEC. II.
Chololithus
means.

illness. I have seen," says he, "a man of patience and courage rolling upon the floor, and crying out through the violence of this pain, which I was hardly able to lull into a tolerable state with nine grains of opium given within twenty-four hours, to which he had never been accustomed: and yet his pulse was all the time as perfectly quiet and natural as it could have been in the sweetest sleep of perfect health."*

Sometimes
pain in the
right hypo-
chondrium.
Accounted
for.

Together with the pain at the pit of the stomach, which is acute in almost every instance, there is sometimes a pain also in the region of the liver; and not unfrequently it commences here. For this it is not difficult to account. Membranous canals, with a very few exceptions, are most sensible at their extremities; and an irritation excited in either extremity acts by sympathy upon the other. A stricture in the prostate gland produces pain, while making water, in the glans penis; and notwithstanding the comparative insensibility of the rectum, which forms one of the exceptions to which I have just referred, faintness at the stomach is almost always accompanied with a relaxation of the sphincter ani, so that the stools issue involuntarily. Now in passing a gall-stone the pain is greatest on its first entrance into any one of the ducts, or on its reaching the extremity of the ductus communis just before it is disgorged into the duodenum, in consequence of the greater sensibility of these parts. In the former instance, its direct seat is in the origin of the canal, near the liver; in the latter, in its termination towards the pit of the stomach: but as the one extremity acts by sympathy on the other, both these organs must be affected in a greater or less degree; and as the duodenum and stomach possess a finer sensibility than the liver, we perceive readily why the pain is more pungent in the former, than in the latter region. When the concretion has fairly entered the ductus communis, the pain remits, but generally returns with sudden violence on its reaching the duodenal point: and we hence see the reason of that additional attack of severe agony, which a patient often sustains after having flattered himself that the disease was completely subdued. The calculus, when voided, has sometimes been found to measure nearly two inches in its long diameter, and upwards of three inches and a quarter in its widest circumference.†

Treatment.

In the treatment, all that we can accomplish is to ease, and, as far as possible, accelerate the course of the gall-stone. Formerly, when the gall-bladder was suspected to be completely gorged, its walls thickened from long continued irritation, the concretions too large to be forced forward, and the pain permanent and severe, attempts were made to remove them by a section into the cyst. Bloch† gives a singular case of this kind, in which not fewer than sixty-two distinct calculi were taken away with success. But in general the operation has not answered, or has been followed by a formation of other crops of concre-

Section into
the cyst has
not general-
ly answered.

* Med. Trans. ut suprâ. † Brayne, Medico-Chir. Trans. vol. xii. art. xxi. ‡ Medic. Bemerkungen. No. v.

tions; so that Morgagni and many later writers* of eminence have strongly reprobated the use of the knife, and it is rarely or never had recourse to in our own day. In reality there seems to be no just cause for its use. At the time that the gall-stone is in the bladder, to whatever extent it enlarges, the progress of enlargement is slow, and the capacity of the gall-bladder will, in most cases, without much irritation, and sometimes with very little inconvenience, expand to meet its growth: while the moment it has quitted the cyst, and has entered into the duct, it is in vain to attempt to follow it up to any particular spot.

Our best and wisest exertions, therefore, must be of a palliative kind, with a view of easing and quickening the passage of the gall-stone. We have no direct means, however, of doing the last: and all we can hope to accomplish, is that of rendering a little collateral assistance to the expulsive efforts which are made by nature herself. The duct becomes dilated by the circumambient pressure of the concretion as it gradually passes forward, urged on by the same action that propels the bile in a state of health. Vomiting, therefore, by compressing the whole abdominal viscera, and, particularly, the full and distended gall-bladder and biliary vessels, may afford one mean of pushing forward the concretion: but a gentle force, and consequently gentle vomits, will promise fairer than those which act violently. Dr. Darwin affirms, that in two instances he saw from thirty to fifty gall-stones voided after taking only an oil vomit. If the patient be of tolerable vigour, and inflammation be apprehended, bleeding should precede the exhibition of emetics. Cathartics, by exciting the action of the intestines, and directly stimulating the mouth of the common bile-ducts, contribute, also, to excite action through its entire range, and thus farther favour the expulsion of the concretion. And as we often find its passage evidently opposed by spasmodic constriction, opium, given very freely and repeated every hour or two, and relaxing the skin by fomentations or the warm-bath, will in such cases be of essential service. Horse-exercise cannot always be made use of: but where it can be submitted to, it is one of the best auxiliaries we can recommend.

We know of no solvent of biliary concretions worth attending to. The essential oil of turpentine was at one time regarded as a very powerful medicine of this kind; and, as such, was strongly recommended and very generally employed by Van Swieten,† Bloch,‡ Durande,§ and many other celebrated characters, sometimes alone, but more generally combined with alcohol, or the sulphuric or nitric ether. More recent practice, however, has not justified its possession of this virtue; and, if it were ever serviceable, it must have been as an antispasmodic rather than as a solvent. Durande, indeed, seems to have act-

GEN. III.
SPEC. II.
Chololithus
means.

No just
cause for the
operation.

Palliatives
most ad-
visable.

Vomiting
how far ser-
viceable.

Venesection.

Cathartics.

Opium.

Fomenta-
tions.
Horse-
exercise.

Biliary
solvents.
Oil of tur-
pentine how
far a sol-
vent.

* De Sed. et Caus. Morb. Ep. xxxvii. Art. 52.—Sharp's Critical Enquiry, ch. vi.—Le Dran, Consultations sur la plupart de Maladies, &c. † Con-
stit. Epid. Lugd. Batav. p. 102. ‡ Bermerkungen, No. v. § Observa-
tions sur l'Efficacité du Melange d'Ether Sulphurique et d'Huile Volatile de
Terebinthine, &c.—Strab. 1790.

GEN. III.
SPEC. II.
Chololithus
means.

Disease not
often fatal.

ed upon this view; for his formula consisted of three parts of sulphuric ether to one of the oil. Yet where there is danger of inflammation, such a medicine must be always too stimulant; and Dr. Percival has good grounds for remarking, that its internal use is productive of mischief.* It is not often that this disease proves fatal, or even essentially injures the constitution, except where there is an habitual predisposition to the generation of gall-stones, and the frame is worn out by a chronic succession of irritation and pain. [Such predisposition is, perhaps, best counteracted by the exhibition of alkalies, soap, nitric acid, taraxacum, the Cheltenham and other mineral waters.]

GENUS IV. PARABYSMA.—VISCERAL TURGESCEENCE.

Knotty or unequal intumescence of the abdomen from an indurated enlargement of one or more of the viscera contributory to the digestive function; derangement of the general health.

Character of
the genus.

This genus is intended to comprise a natural and extensive division of diseases, consisting in an infarcted protuberance of one or more of the collatitious organs of digestion; commonly produced by a deficient action in the absorbent vessels of the part affected.

Former
names.

The name, under which the disease has been described by Hippocrates, is *megalosplanchnus* (μεγαλοσπλᾶγχνος) "or big-bowel:" which Cusson and others, on account of its length, have exchanged for *PHYSCONIA*, a word literally importing "inflation;" and so used by both Greeks and Latins. For dismissing the former, there is, perhaps, sufficient reason; but *physconia* ill supplies its place, as conveying no correct or definitive meaning; whence it has been employed by different writers in so loose a manner, as to comprise a variety of organic tumours that have no relation whatever, in origin, position, properties, or mode of cure. The word, therefore, is not worth preserving, either in respect to its primary or general sense: and it is on this account I have ventured to exchange it for *PARABYSMA* (ΠΑΡΑΒΥΣΜΑ), from *παράβω*, a genuine Greek term, in use among the Greek classics, and distinctly signifying morbid congestion, coacervation, or infarction, which is the prominent character of the genus.

Etymologi-
cal sense of
parabysma.

All the viscera of the abdomen are subject to an indurated enlargement of this kind from various causes, of which some are common to the whole, and others peculiar to themselves; among the former should be especially noticed that destitution of valves in their veins, and consequently that want of support to the returning column of blood which belongs to the veins that are distributed to more superficial parts. The local causes will be noticed when treating of those enlargements in their respective order. The species are numerous, and may be arranged under the following heads:

* Essays, II. p. 232.

| | | |
|-------------------------|---|------------|
| 1. PARABYSMA HEPATICUM. | TURGESCENT OF THE LIVER. | GEN. IV. |
| 2. ————— SPLENICUM. | TURGESCENT OF THE SPLEEN. | SPEC. I. |
| 3. ————— PANCREATICUM. | TURGESCENT OF THE PANCREAS. | Parabysma. |
| 4. ————— MESENTERICUM. | TURGESCENT OF THE MESEN- TERY. | |
| 5. ————— INTESTINALE. | TURGESCENT OF THE INTES- TINES. | |
| 6. ————— OMENTALE. | TURGESCENT OF THE OMENTUM. | |
| 7. ————— COMPLICATUM. | TURGESCENT COMPOUNDED OF VARIOUS ORGANS. | |

SPECIES I. Parabysma Hepaticum.—*Turgescence of the Liver.*

Hard tumour in the right hypochondrium, verging towards, and sometimes appearing at, the pit of the stomach; general languor; pale or yellow countenance; dyspepsy; dejections irregular, often whitish.

It is necessary to observe, that the word tumour is used in different senses by different writers; commonly importing a morbid, and mostly a circumscribed, swelling or enlargement of any organ; but limited by Mr. Abernethy to "such swellings as arise from some new production, and which make no part of the original composition of the body."* This sense, however, he admits to "trespass against the usual import of the word;" and seems even too restricted for his own use; since he is soon afterwards obliged, as he confesses, to extend it to enlargements of glands while they still continue to make part of the original composition of the body, and even to perform their function. In the limited sense here aimed at, TUBER would be a far better word than tumour, as less likely to produce confusion, and as already in some degree known to the language of medicine, in a restricted sense, by its diminutive, TUBERCLE. In the present work, the term tumour is employed in its ordinary signification.

There is still much difficulty in accounting for the morbid growth of tumours of any kind, and especially of those which constitute the genus before us: which sometimes are found, on dissection, to consist of an enlargement or extension of the general structure of the affected organ; and sometimes of distinct lumps, or tubers of a very different structure, embedded in the body of the organ, seated on its surface, or merely attached to it by a narrow neck or footstalk.

The simplest mode of conceiving their origin, is by the deposit of some living fluid into a cell of the cellular structure, or the follicular gland of a mucous membrane, possessing an increased excitement by the pressure of the surrounding parts or from some other cause of irritation. Mr. Hunter believed, as

Tumour
used in va-
rious senses.

Abernethy's
definition:
too limited.

Tuber.

Meaning of
tumour in
the present
work.

Growth of
tumours not
easily ex-
plained.

Simplest
hypothesis.

* Surgical Observations, containing a Classification of Tumours, p. 6. 3vo. 1804.

GEN. IV.
SPEC. I.

Parabsysma
hepaticum.

How ap-
plied by J.
Hunter,
and his fol-
lowers.

Hypothesis
of Baron.

Either hy-
pothesis too
limited.

Living prin-
ciple in
almost all
the fluids of
the living
body,

and forms
the instinc-
tive princi-
ple.

Instinct
what.

Hence not
the coagula-
ble blood
only, but
most other
fluids have
a tendency
to produce
new forms.
These forms
definite in
health :
indefinite in
disease.

Hence the
vast variety
of morbid
accretions
or growths
daily met
with : and
their differ-
ent degrees
of organiza-
tion.
Illustrated.

we shall have farther occasion to remark when treating of phthisical tubercles, that "the living fluid which has the greatest tendency to assume a vascular structure when thus collected or effused, is the coagulable part of the blood," for which opinion there seems to be great reason. And hence, those who have chiefly supported his doctrines in our own day, and especially Sir Everard Home* and Mr. Abernethy,† confine the origin of vascular tuberos growths to the sanguiferous system, and especially its coagulable part alone ; while Dr. Baron has still more lately restricted them quite as absolutely to the absorbent system : contending that "our hopes of being able to avert or cure such maladies must rest upon some other means, than those which are merely calculated to subdue vascular action."‡

Either of these views appears to be too narrow. Mr. Hunter has sufficiently shown, that a living principle appertains to almost all the fluids of the living body that are formed for its accretion, though the animal oil seems to possess less than any of the rest. He has shown it to exist in the chyle ; it is known to every one to exist in the semen, and is transferred to the egg when it first drops from the body of the mother, and before a single particle of blood is elaborated. It is this, in truth, which is the instinctive principle of healthy living matter, whether animal or vegetable : instinct itself being nothing more than the simple law of life, or of such living principle in a state of activity or operation, directed to the definite end of completing single organs or the general system, preserving them in health, or reproducing them for future use.

It is hence probable, that most, if not all, the living fluids, and not merely those of the coagulable part of the blood, or the semen, have a tendency to produce new forms and tissues, and will do so under a particular state of excitement, and if duly supplied for this purpose. So long as a state of health, or the natural law of the instinctive principle influences them, these productions will be uniform and definite ; but if the healthy power decline, and the natural law dependent upon it cease, the action still continuing without a modifying guide, the productions must be indefinite and anomalous in every possible diversity, according to the contingencies by which they are surrounded. And hence, alone, as it appears to me, can we account for the elaboration of all those infinite varieties of fluids or of fabrics which different tumours present to us ; and those monstrous attempts at organization which we occasionally meet with in organs of every description, sometimes stimulating or even elaborating hair, sometimes flesh or muscular fibre, sometimes brain, sometimes suet, sometimes honey-comb or other cells, sometimes a tooth, or a nail, or various organs of a fetus in a nidus where we should least expect to find it, and marvel with all

* Transact. of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. i. p. 231.

† Classification of Tumours, p. 11.

‡ Enquiry into the Nature of Tuberculated Secrecions, &c. p. 122.

our might how it could possibly get there. "The tumour," says Mr. Abernethy, "derives a supply of nourishment from the surrounding parts: it seems to live and grow by its own independent powers; and the future structure which it may acquire seems to depend on the operation of its own vessels." All this is quite correct; and it is the object of the preceding remarks to show from what source it is possessed of such independent powers, and, by what means they are rendered subservient to such an infinite variety of sportive and anomalous effects.

We have thus far supposed the morbid growths before us to have issued from the cellular texture, or the serous or mucous membranes of organs. But there is no difficulty in applying the whole of this argument to the substance or parenchyma of organs as well as to their surface; for effusion may take place in any part of their structure, and the tubercle of the future tumour may consist of a minute drop of such effused fluid within the organized wall, or whatever it be that surrounds or embeds it. And hence the morbid turgescence may consist either in an enlargement of the general substance of the viscus, or in parasitic tubers more or less closely connected with its surface. "There seems every reason to believe," observes Dr. Abercrombie, "that the peculiar disposition which constitutes it (tubercular disease), may take place from any tissue of the body: in some cases, slowly and gradually; in others, the result of a low inflammatory action of a peculiarly unhealthy character."*

The organ hereby becomes weakened in its healthy action, and consequently is more disposed to fall a prey to whatever vermicles or their eggs are by any means able to obtain an entrance or a deposite in it: and hence it is nothing uncommon to meet with worms of various kinds, as we shall presently have occasion to notice, that have converted one or more tubercles into a nest, or other habitation; and to propagate their kind with great rapidity: and hence more especially the origin of flukes and hydatids in hepatic parabysma. Some constitutions are far more predisposed to such morbid changes than other constitutions; and some animals than other animals. The swine genus more perhaps than any of the rest. It is not however easy, and at times is perhaps impossible, to distinguish between simple limpid tubercles in their first formation and hydatid worms. Dr. Baron has withdrawn himself entirely from the question, and employs the terms almost, if not altogether, synonymously, without venturing to determine upon the animal life of what are ordinarily called hydatids, under any form or magnitude. [According to Dr. Baron, the tubercle commences as a vesicle, and is nothing more nor less than an hydatid. Dr. Armstrong finds, however, that the vesicular appearance of the tubercle is simply an accidental occurrence, dependent on the texture of the part in which it is placed. Tubercles, he says, may have the vesicular appearance in the lungs; but, if

GEN. IV.
SPEC. I.
Parabysma
hepaticum.

Doctrine
applies
equally to
the coats or
parenchyma
of organs.

When
flukes or
worms often
found in the
interior of
organs.

The swine
genus particularly
predisposed
to such
morbid
effects.
Simple limpid
tubercles and
hydatid
worms not
always distinguish-
able.
Terms employed
synonymously by
Baron.

* On the Nature and Origin of Tubercular Disease. Trans. of the Medico-Chir. Soc. Edinb. vol. i. p. 637.

GEN. IV. minutely examined, they will be found to be the extremities of
 SPEC. I. the bronchial tubes, or air-cells, into which the peculiar depo-
 Parabysma site, constituting tubercle, often takes place. On the serous mem-
 hepaticum. branes, Dr. Armstrong has never found them to be, strictly
 speaking, vesicles. He regards tubercles as secretions from the
 ultimate ramifications of the arteries.*] Dr. Jenner seems at
 Jenner's times to have carried the animalcular hypothesis too far, even
 hypothesis. admitting that it has a real foundation; and the following passage,
 which contains a valuable piece of natural history, may at the
 same time form an illustration of this remark. It occurs in a
 As applied letter to Dr. Baron. "Nothing is more common than tuber-
 to swine. cles in the liver, and among other viscera, of the pig: but these
 for the most part arise from the common hydatids with thin
 coats, while those which give birth to the term *measley*, are of
 a different kind. They pervade almost every part of the ani-
 mal, the heart, the diaphragm, the serous and the mucous mem-
 branes, the eyes, &c. The disease proceeds not unfrequently
 to such great lengths, that from a fourth to an eighth part of
 the animal is infested with them. The inferior part of the neck
 and haunches now become œdematous, and effusions take place
 into the cavities. These hydatids differ from the hydatids of
 the liver in being of a more diminutive size; they are for the
 most part not larger than ordinary shot, and to the feel are al-
 most as hard: they differ, too, in having thicker coats, and con-
 sequently have less fluid within them. I have rarely seen them
 so large as middle-sized peas. Similar to this species of hyda-
 tid is that which pervades the interior of the brain of sheep,
 and appears to be generated on the coats of the ventricles. I
 have found them adhering to it, and also swimming in the fluid
 which had been let loose into these cavities, occasioning hydro-
 cephalus internus, vertigo, and death."†

Remarks. Now the character of this last hydatid, the *tænia cerebialis* of
 Leske, has been sufficiently ascertained to admit its animalcular
 origin; it is rarely larger than a grain of sand, and is furnished
 with from thirty to thirty-six hooks, by which it fixes itself
 firmly to the substance of the brain or of its coats, and especial-
 ly in yearling lambs, producing that staggering or vertiginous
 disease which is provincially known by the name of *Dunt*. It
 is also highly probable, that the first kind of hydatids here re-
 ferred to, are equally entitled to an animalcular classification;
 but the measley tubercles that form the second, seem rather to
 be an idiopathic disease of the constitution itself, propagating
 new growths of the same kind from organ to organ through eve-
 ry part of the animal; and in the pig, as well as in other quad-
 rupeds, well ascertained to be induced in many instances by in-
 nutritious food as an exciting cause.

Dunt. It is conceived by many pathologists, that the intumescences
 we are now considering, necessarily require an inflammatory
 action of the organ for their production; and that they are, in

Whether
 inflamma-
 tory action
 requisite for
 new
 growths.

* Morbid Anat. of the Bowels, &c. p. 16. 4to. Lond. 1828.

† Baron on Tuberculated Accretions, p. 131.

fact, for the most part merely results of what is called chronic inflammation. M. Bichat has with great justness controverted this opinion in his remarks on membranous tubercles, that “*foule de petits tubercules blanchâtres qui est si fréquent sur ces membranes* ;” * and has said that we must look to another quarter than that of phlegmasiæ for their origin : although he seems manifestly to err in regarding tubercles of this kind as solely capable of originating from serous membranes, and never existing in the subjacent substance of an organ, except towards the last stages of the complaint in which they are propagated by the cellular texture ; being in his estimation “*une affection, propre à ces membranes ; comme les éruptions, miliars le sont à la surface cutanée, comme les aphtes le sont aux surfaces muqueuses*.” The nature of many of the morbid growths belonging to the present genus will abundantly show, that tubercles of all kinds may take their rise from the interior as well as from the surface of organs ; as their history will also, that they may originate without any sense of heat or pain, without any augmentation of the pulse, or any other sign of inflammatory action. A certain but low degree of such action may indeed accelerate their growth, and augment their number, as one kind of exciting cause ; but congestion from weak action is a cause far more frequent ; and accidental irritation not much less so. The subject, however, is still a source of controversy ; the opinion of M. Bichat, that inflammation is not a necessary source of tubercles in any case, being powerfully supported by MM. Bayle, Laennec, Rostan, Louis, Velpeau, and Armstrong ; while their origin from inflammation alone is as warmly contended for by M. Broussais and his numerous adherents.

[In particular, the latter is the doctrine adopted by Professors Andral† and Cruveilhier‡ and, as Dr. Alison observes, the testimony of Andral is the more valuable, as his previous opinion, in regard to the formation of tubercles, appears to have been nearly the same as that of Laennec. The paper and facts by Dr. Alison himself, in support of the same doctrine, are highly interesting.§

Dr. Armstrong, who inclines to the opinion of Bichat, has observed, that against the idea of tubercle being simply the effect of inflammation, many facts might be adduced. In numerous instances, where tubercular points are scattered over the pleura, or peritoneum, the serous membrane is transparent up to these points, and only becomes reddened or opaque when the tubercle has become progressive or enlarged, so as to act as a local irritant. Dr. Armstrong considers it probable, that tubercle is connected with fibrinous effusion, but that the latter is not necessarily connected with inflammation. He admits that tubercle and inflammation are often co-existent, and so are the hydatid and tubercle occasionally ; but co-existence does not imply a direct dependence or relation.||]

GEN. IV.
SPEC. I.

Parabysma
hepaticum.

Denied by
Bichat,
who errs in
limiting tu-
bercles to
serous tis-
sues alone.

Arise from
the interior
as well as
the exterior
of organs :
and without
any proofs
of inflam-
matory ac-
tion: though
their growth
may be ac-
celerated by
a certain de-
gree of it.

* Anatomie Générale, tom. iv. p. 517. † Clinique Méd. tom. iii. ‡ Bibliothèque Méd. Sept. 1826. § See Edinb. Med. Chir. Trans. vol. iii. ed. 1828. || Armstrong, Morbid Anat. of the Bowels, &c. p. 17, Lond. 1828.

GEN. IV.
SPEC. I.
Parabysma
hepaticum.

This disease originates from different causes, and is marked by symptoms and effects of very different kinds. The diversity of the symptoms, however, is not always sufficient to point out the real nature of the swelling, which, in many instances, can only be determined by a post obit examination. Yet the following varieties may be noticed as frequently distinguishable during life :

- | | |
|-------------------------|--------------------------------|
| α Coactum. | From simple parenchymatous |
| Atonic turgescence. | coacervation. |
| β Scirrhusum. | Accompanied with a hard and |
| Scirrhus turgescence. | scirrhus feeling. |
| γ Chololithicum. | Accompanied with an occasion- |
| Gall-stone turgescence. | al discharge of bilious con- |
| | cretions. |
| δ Helminthicum. | Accompanied with an occasional |
| Vermicular turgescence. | discharge of worms or larvæ. |

α P. hepaticum coactum.
Found in feeble children, in intemperate livers, and in new comers into hot climates.

β P. hepaticum scirrhusum.
Found chiefly in scrofulous habits and in intemperate livers. Varies in seat and form.

Sometimes contracted in size by a scirrhus stricture.

γ P. hepaticum chololithicum.

Calculi found in different parts, and under different forms.

The FIRST of these very generally paves a way to one or other of the three ensuing; and is found most frequently in feeble children who secrete little bile. It is also found very frequently in intemperate eaters, and in foreigners who reside in hot climates; a considerable degree of atony being produced in the liver from the exhausting stimulus of the rays of the sun, and an excessive use of spirituous potations.

In a scrofulous habit, a liver, thus enlarged and infarcted, is apt to become SCIRRHOUS in children, if not early attended to, as it is also in the gormandizers just alluded to, who have long habituated themselves to the luxuries of the table. Sometimes the scirrhus is confined to a part of its margin; sometimes it appears partially on its surface; sometimes it runs through one or the other, or both its lobes: and sometimes also, the portion that becomes scirrhus evinces a tubercular structure, and consists of clusters of simple tubercles before the scirrhusity takes place.

It is not always, however, that a scirrhus or even a tubercular structure of the liver occasions its enlargement. In many instances, indeed, it does so; but Dr. Baillie has given examples, illustrated by plates, in which the liver has hereby shrunk into a size considerably below its natural proportion.* This disease may be generally detected by an accurate examination of the hypochondrium with the hand.

Almost all the affections of the liver, appertaining to the division before us, appear to owe their origin to atony or hebetude in the organ: and hence the common rise of that VARIETY of turgescence which is accompanied with BILIOUS CALCULI. These are sometimes diffused like granules over the substance of the liver, or amongst the biliary pores; they are sometimes confined to, and load one or more morbid cysts existing in the liver; and are sometimes naked, concrete, and crystallized;

* Morbid Anat. pl. ii. fig. ii. p. 102.

of which I have referred to various examples in the volume of Nosology. These are occasionally to be found in the dejections. GEN. IV.
SPEC. I.

In the variety distinguished by the existence of GRUBS AND WORMS, the fluke is, perhaps, sometimes to be found even in the human liver. Doever and Clarke, as already observed, assert this, and Darwin confirms their assertion. That they are found in almost all other animals, is admitted by every naturalist; although Dr. Harrison, of Horncastle, has lately ventured to deny, that they are to be traced in sheep in the well-known disease called the rot. But the vermicles chiefly observable in the variety of parabysma before us are hydatids. P. hepaticum helminthicum.
Fluke sometimes found in the human liver.
But chiefly hydatids.

"These," says Dr. Baillie, "consist of spherical bags of a white or light amber colour, more or less transparent, and are lodged in cartilaginous cysts. The cysts are lined with a brownish pulpy membrane, resembling very much the coagulum of the blood; but this membrane is more or less distinctly marked in different cases. The cysts are sometimes surrounded on every side by the substance of the liver, and sometimes are formed at the surface, so as to be partially seen without dissection. The hydatids themselves contain a transparent fluid, which is capable of being coagulated by heat and by acids, and sometimes contain also smaller hydatids floating in this fluid. On many occasions very small hydatids are found adhering to the coats of the larger hydatids, and appear to the eye like small pearls. Hydatids of this species seem to be animalcules of a very simple structure; and although they are not often formed in the liver, yet they grow more frequently in this gland than in any other of the body."* Description of hydatids so found.
Smaller hydatids often found adhering to larger.

The hydatids die in process of time like other animal forms, and their place is supplied by their progeny. When they die, the bags and cysts are often broken up, and become frittered into minute tatters and filaments, fragments of which pass occasionally by the biliary ducts into the duodenum; and, being rejected with the feces, are at times mistaken for portions of the villous coat of the intestines. Fragments of their cysts often mistaken for portions of the villous coat.

As this species of parabysma depends almost entirely on an atony of the liver, the intumescence increases in many instances in proportion to that atony, and particularly where debility of the liver is combined with a general debility of the entire system. And hence the liver is frequently known to enlarge in proportion as every other organ becomes torpid and decays. On which account the liver is often found of an enormous size in dropsical patients. Mr. Gooch gives a case in which, during dropsy, it acquired the monstrous weight of twenty-eight pounds.† Baldinger reports another instance in which it reached twenty pounds;‡ and Bonet a third, in which it weighed only two pounds less.§ Liver often acquires a prodigious size.

In recent stages, and especially in children and young per-

* Morb. Anat. p. 107. pl. 5.
band vii. p. 275.

† Med. and Surg. Obs.
§ Sepulcr. lib. i. sect. xviii.

‡ N. Magaz.

GEN. IV.

SPEC. I.

Parabysma
hepaticum.Metallic
salts.
Those of
mercury
most valu-
able.Purging to
be employed
occasion-
ally.Ammoniac-
mercurial
plaster.
Tartar-
emetic
ointment.Diluted
aqua regia.Good effects
of mercury :

sons, this disease may often be successfully attacked by warm purgatives and tonics, and especially by those valuable alterants that change the action of both the excretory and absorbent system, diminishing the irritability of the first, and restoring the power of the second, and thus reinvigorating them alike.*

Many of the metallic salts and oxides have a tendency to do this, and especially those of zinc, copper, iron, and silver. But those of mercury are, for the present purpose, far more valuable than any of the rest. This mineral should be given in mild forms and gentle doses only, so that it may be persevered in for a considerable period of time. The black or red sulphuret of mercury, or the blue mercurial pill, has been employed indiscriminately; but small divisions of calomel, as a grain or a grain and a half a day, for an adult, or the compound calomel pills, as invented by Dr. Plummer, in the proportion of five or six grains a day, will often answer much better. In the mean time, an occasional purging must be persevered in; and, if worms be suspected in the intestines, they must be removed by the treatment already laid down. I have also found benefit from an application of the emplastrum hydrargyri cum ammoniaco, large enough to cover the entire hypochondrium: or the use of the tartar-emetic ointment, as already recommended in certain conditions of dyspepsy; and, where particular circumstances have prevented me from using this, from sponging the abdomen daily with aqua regia, diluted with about forty times its measure of water, which, as already observed, reduces it to the sourness of weak vinegar.

As far as my own experience goes, I have had so much reason to be satisfied with the good effects of mercury, that I have rarely employed any other medicine; and though I cannot say, with Dr. Cullen, that its effects are to be ascribed solely to the stimulus it gives "to the excretories, and not at all to any change produced in the state of the fluids," yet the following remark of the same distinguished writer is entitled to general attention: "Universally mercury, in its active state, seems to be a stimulus to every sensible and moving fibre of the body, to which it is immediately applied; and, in consequence, it is particularly a stimulus to every excretory of the system to which it is externally or internally applied. Besides its noted effects upon the excretories of the saliva, it seems to operate upon the whole of those of the alimentary canal. It proves often diuretic; and I have particular proofs of its reaching and acting upon the organs of perspiration. Although it may sometimes operate more upon certain excretions than upon others, it may be presumed that, when any tolerable quantity is thrown into the body, it is in part distributed over the whole; and therefore its medicinal effect is, that it is the most universal aperient and deobstruent known."†

I have not, however, found that it gains much advantage, at

* J. Kaemph. Abhandlung von einer neuen Methode die hartnächigster Krankheiten des Unterleibes sicher und gründlich zu heilen. 8vo, Leipzig. 1786.

† Mat. Med. part ii. chap. xvii. p. 443.

least in the disease before us, by being united with sulphur, or sub-doses of nitric acid, as in the pulvis mercurii cinereus of the late Edinburgh Pharmacopœia; but the sulphurets of antimony seem to increase its effect.

M. de Sauvages relates a singular case of this disease, in which this compound effected a cure, upon the authority of M. Broussonnet, in whose practice it occurred. "The patient, who was a woman of forty years of age, had laboured for fifteen years under a tumour in the region of the liver, which had increased annually to such an extent, that, though a widow, she appeared to be pregnant with twins. The tumour preserved the external figure of the liver; was very hard, and enormously large, and would bear a forcible pressure without pain. She breathed short on walking up hill; but her feet never swelled, and the menstrual flux was regular. Being tired of the medicines which the most distinguished physicians had prescribed for many years, and myself for many months, without any advantage, she swallowed, at one and the same time, a drachm and a half of mercurius dulcis (calomel;) a remedy which, mixed up with conserve of elecampane, and divided into various doses, I had prescribed for her to take within the course of five days. Scarcely had she swallowed the medicine three hours, when she was seized with a most violent pain in the abdomen, and exclaimed, in the midst of her agonies, that she felt something rushing from the breast to the lowermost part of the belly. Meanwhile the swelling disappeared, and the patient, almost lifeless, threw herself on the bed. Visiting her at this time, I found great prostration of strength, the pulse scarcely vibrating, the intestines, so to speak, swimming in water, and on my slightly pressing the part where the swelling had formerly existed, she felt acute pain. Within four days her powers revived, the abdomen swelled generally, a fluctuation was evident; and, on the seventh day, upon a consultation with that distinguished physician Doctor Farjeon, we determined on the paracentesis; from which day to the tenth, fifteen pints of limpid water were drawn off. Within three days, however, from the operation, the ascites returned, and not the abdomen only, but the whole body, partook of the swelling. This dropsical habit was attacked with the vegetable hydragogues of most celebrity, but in vain; in consequence of which we had recourse to a combination of calomel and crude antimony; and by this the dropsy became so completely dispersed, and the patient so perfectly recovered, that she has now reached the third year of continued health; and the liver will bear a hard pressure without pain of any kind."*

Where the disease exists in feeble children, repeated emetics have been of service, by rousing the torpid absorbents of the liver into fresh action. As the use of the prussic acid has of late been revived for several kinds of visceral affections, I ought not to omit stating, that, in the form of an infusion of

GEN. IV.
SPEC. I.
Parahysma
hepaticum.
especially
when united
with anti-
mony;
as in a case
of Sauvages.

Emetics
when in
children.
Prussic
acid.

* Class x. Ord. II. Gen. IX. Physconia. † 3.

GEN. IV.
SPEC. I.
Parabysma
hepaticum.

laurel-water (*prunus laurocerasus*,) it is said by various writers to have been serviceable in the disease before us, some of whom have tried it externally, others internally, and a few both ways;* but as I know nothing of it from my own experience, I limit myself to giving this hint.

Prepara-
tions of
iodine.

The preparations of iodine have a far better claim to our attention, not only in respect to the present, but to all the species of parabysma, from their peculiar tendency to promote absorption in morbid growths in general. Dr. Baron,† who has extended and enlarged on M. Coindet's experiments, thinks there is no medicine that can rival their salutary powers. But we shall have occasion to notice them still farther when discussing bronchocele, in which they seem especially efficacious. In every trial, however, whether external or internal, they require more caution than is ordinarily exercised, and should be commenced in very small and circumspect doses, from their irritant power.

Protracted
nausea.

There is also another remedial plan which has been greatly praised at various periods, and especially of late, for its certainty of success, and that is, a protracted nausea. In many cases this has been unquestionably, and even eminently serviceable; and tuberosities of extensive range, and in some instances when seated on the surface of the bony, or the extreme membranes, occasionally even those of bronchocele, have been wonderfully diminished, or even entirely removed, in a few weeks.

To be used
with great
judgment:
and why.

It is necessary, however, upon this subject, to draw a line of distinction, or we may do much mischief instead of great good. Continued nausea—and to be of any use it must be continued for some weeks—operates by promoting absorption; or, in other words, by withholding the usual supply of recreation from the organs of the animal frame, rouses them to provide for themselves, from whatever quarter they may. Hence organs prey upon organs, as the beasts of the woods upon beasts; and the adscititious growths having the weakest degree of living principle in most cases, these are voraciously laid hold of, and carried off in the way of nutriment or assimilation. But it may happen, that an organ, which has given rise to adscititious growths, is in so debilitated a state as to be incapable of overcoming the living power of its own parasites; and, in this case, the exertion only weakens it still more, and of course the nausea adds to the disease instead of removing it.

It is only, therefore, when the general habit appears good, and the general strength pretty firm, that we can reasonably expect any advantage from protracted nausea; and hence, comparatively, but rarely in the present disease, which, as already observed, is for the most part an effect of laxity of structure, or hebetude of action. Weakly infants and children are far more subject to abdominal enlargements of the kind before us, than

* Baylie's Pract. Essays.—Percival's Pract. Essays, vol. i. p. 36.

† Illustrations of the Inquiry respecting Tuberculous Diseases, 8vo. 1822.

those in health ; and it is well known, that we may at will produce any extent of tubercles in the liver of rabbits, by feeding them with poor or insalubrious food.

GEN. IV.
SPEC. II.
Parabysma
splenicum.

SPECIES II. Parabysma Splenicum.—*Turgescence of the Spleen.*

Indurated tumour in the left hypochondrium, verging towards the spine ; pale countenance ; general debility.

ENLARGEMENT of the spleen is, for the most part, less mischievous than enlargement of the liver ; and there is hardly any organ, that either nature or art may take so many liberties with, without seriously affecting the general health. It has been found wanting ;* it has been found double ;† and even treble ;‡ and when in a state of disease, in a few rare instances, it has been utterly extirpated without injury ;§ or has continued of an enormous size for thirty years and upwards.|| [But, though the spleen cannot be regarded as a vital organ, or one of much sensibility, it appears, as Dr. Abercrombie has correctly remarked,¶ to exert an important influence upon the functions of the stomach. It may, however, only have this influence when diseased ; for, according to numerous experiments, performed under the inspection of Baron Dupuytren, the spleen may be removed from dogs, and yet such of these animals, as recover from the operation, live afterwards, without the slightest impairment of their digestion, absorption, circulation, respiration, power of barking, secretions, nutrition, locomotion, sensibility, sensations, instinctive faculties, and generative functions.** In general, however, in the human subject, the more the spleen exceeds its natural size, and the longer it continues in this state, the greater is the emaciation of the individual, and the impairment of his health. Respiration, digestion, and the functions of the intestinal canal, must, indeed, unavoidably be disturbed by any considerable enlargement of this organ.

Morbid
state of the
spleen less
mischievous
than that of
most other
viscera.

The spleen is liable to acute and chronic inflammation ; to suppuration ; mortification ; tubercular disease, and the slow suppuration usually following that affection. Inflammation may affect either its external peritoneal covering, or its substance. The first case may be restricted to the investment of the spleen ; but, in almost every instance, the peritoneum of the adjacent organs participates in the affection. In peritonitis, also, the external coat of the spleen is inflamed, as well as the rest of the peritoneum. Dr. Abercrombie had an opportunity of seeing a spleen that was studded throughout with innumera-

* Pohl. Pr. Casus anatomicus, &c. defecta Lienis. Lips. 1740.

† Schenck, Observ. lib. iii. N. 84. Cabrolus, Observ. N. 15.

‡ Schenck, loc. citat. § Valisneri, Opp. iii. p. 123. Bartholin. Hist. Anat. Cent. iv. Hist. 51. Ferguson, in Phil. Trans. for 1733. || Darw. i. ii. iii. 18. Sauv. loc. citat. ¶ Edin. Med. Journal, No. 80, pl. 1.

** L. et P. P. Assolant, Recherches sur la Rate, 8vo. Paris, 1802.

GEN. IV.
SPEC. II.
Parabysma
splenicum.

ble tubercles, all in the solid state, in the body of an infant, aged eight months, who died of extensive disease of the bronchial glands. In a more advanced stage, this tubercular disease presents numerous small abscesses, resembling the vomicæ of tubercular lungs. The disease, however, is usually complicated with tubercular disease in other organs, so that it is impossible to ascertain the symptoms, which arise from the affection of the spleen.* Perhaps the tubercular enlargement, however, may be more disposed to occur in scrofulous constitutions; but it is a much less frequent case, than other chronic swellings of the spleen.]

Parabysma splenicum, as a species, is traced under the following varieties:

- | | |
|---------------------------|-------------------------------|
| α Coactum. | From simple chronic enlarge- |
| Ague-cake. | ment. |
| β Scirrhusum. | Accompanied with a scirrhus |
| Scirrhus turgescent. | feeling. |
| γ Cartilagosum. | Accompanied with a cartilagi- |
| Cartilaginous turgescent. | nous induration of the coats. |

α P. splenicum coactum.

The FIRST VARIETY occurs sometimes as a consequence of menostation, or of a peculiar kind of rheumatism; but chiefly after obstinate remittents or intermittents, in strumous or other weakly constitutions, or which have been previously debilitated by intemperance. [The editor has not found chronic enlargement of the spleen to be particularly frequent in strumous subjects. Dr. Abercrombie states,† that it generally arises from intermittent fever, but that it may take place without that cause, or any other cause that can be traced.] When agriculture was in a ruder state than in our own day, and the land left in many parts swampy, and undrained of its stagnant waters; and consequently when tertian and quartan intermittents were far more common than they are at present, this disease was also far more frequent and more obstinate. An injudicious and immoderate use of the bark is said also to have contributed to this affection, and very generally to have increased it. And although we meet with no such mischievous effects in the present day, there can be little doubt, that there was much ground for such a charge formerly. In intermittent fevers, Peruvian bark, copiously administered, is not an idle medicine; for if it do not assist, it will be sure to injure. And as it was formerly given in large and frequent doses, in districts where the patient was daily exposed to the operation of the same swampy miasm that produced the disease at first, it is difficult to conceive how it could produce any benefit.

Produced
by an inju-
dicious use
of cinchona.

“In enlargement of the spleen,” observes Dr. Vetch, in an excellent essay upon this subject,‡ and whose professional employment among the British army at Walcheren afforded him a large field for observation on the disease before us, “the patient seldom or never complains of much pain in the situation

* Abercrombie, op. cit.

† Edin. Med. Journal, No. 80, p. 8.

‡ Medical and Physical Journal, 1824.

where it might be expected: his appetite is generally good, yet his powers of assimilation are obviously deficient: he loses flesh, and is incapable of any muscular exertion. His features have a peculiar, dark, bilious, or mahogany hue, but the conjunctiva preserves its white and healthy appearance. Perspiration is in time wholly suspended, and the skin acquires the appearance and feel of satin; the lips are pale, and there is generally much wasting of the gums; the urine is limpid, and secreted very rapidly, but contains little or no urea. The patient's mind is generally morose and desponding." The extremities are commonly colder, and the pulse quicker, than in health, especially towards the evening.

GEN. IV.
SPEC. II.
α P. splenicum co-actum.

[The pathological researches of Dr. Abercrombie have taught him, that the present species of *parabysma splenicum* varies in its structure, being in some cases a solid fleshy mass; in others, studded with tubercles. In one case, it consisted entirely of an immense bag of hydatids, covered by the peritoneal coat of the spleen, the substance of which was little altered.*]

This variety of *parabysma* also occurs in feeble children. And, in this case, it has often been dispersed by emetics given repeatedly, which stimulate the absorbent vessels into increased activity, and act with considerable success, where a persevering nausea might prove highly mischievous.

Treatment.
In infants, emetics.

Cataplasms that excite vomiting have, for the same reason, in many instances, had the happiest effects. They have commonly been made of tobacco; and Mr. Stedman gives instances of its proving an effectual remedy in both the varieties now adverted to, and in an old man as well as in a boy.† The former had, in the first instance, been attacked with a general numbness, in consequence of sleeping in the open air in the West Indies, while the serenadas, or night-dews, were gathering around him. This was succeeded by a jaundice, and the jaundice by a *parabysma* of the liver, in which the spleen also appears to have catenated; the turgescence continuing to increase for five years, in spite of the medicines prescribed for him. A tobacco poultice was at this time applied, and renewed daily for a month. It produced frequent vomitings, but at the end of the month the patient was cured. The quantity employed at a time was six ounces: for a child one ounce is sufficient.

Emetic cataplasms of tobacco.

Cataplasms of common groundsel (*senecio vulgaris*, Linn.,) the *erigerum* of the dispensatories, are said to prove equally useful by exciting a like effect. Mr. Stedman asserts that he had tried them with complete success: and was at first induced to do so from discovering, that it was the chief ingredient in a poultice which was a popular remedy in his neighbourhood, the materials of which were kept a profound secret by the empiric who employed them.

Groundsel cataplasms.

Dr. Vetch, from an extensive experience of its utility in the island of Walcheren, strongly recommends a weak infusion of the

Arbutus uva ursi.

* Edin. Med. Journal, No. 80, p. 8.

† Edin. Med. Essays, vol. ii. art. v.

GEN. IV.
SPEC. II.

α P. splenicum co-actum.

leaves of the *arbutus uva ursi*, which operates beneficially both as a tonic and a diuretic.* An attack of epistaxis, or an appearance of moisture upon the skin, are generally signs of returning health.

The remaining treatment of this disease may be the same as that laid down for the preceding species.

[Dr. Abercrombie pronounces all the forms of chronic enlargement of the spleen hopeless; an observation, which may be true in relation to the tubercular, and what have been called scirrhus cases; but the editor of this work has seen in military hospitals, both in this country and abroad, so many chronic swellings of the spleen from intermittent fever subside, that he cannot join in the above unlimited remark. Dr. Abercrombie believes, that the less chronic enlargements of the spleen are meddled with the better; and that attempts to reduce them by mercury are generally followed by the worst consequences. An enlargement of the spleen is said to take place in young women in connexion with suppression of the menses, and to yield to a course of purgatives. Dr. Abercrombie has not seen this affection; but he once found it enlarged and tender in a young woman, and it yielded to the repeated application of leeches, with purgatives, rest, and cool regimen.†]

In TURGESCECE of the SPLEEN, whether originating from the preceding, or produced by a strumous diathesis, the organ sometimes assumes a scirrhus hardness; and, in consequence of this symptom, is often felt more distinctly than in the first variety. It acquires, in some instances, a very large size, though often not so large as the turgescent spleen without scirrhus. Sauvages quotes from Bonet a case, in which, after death, it was found to weigh thirty-three pounds, and to fill the whole of the abdomen. The complaint had lasted seventeen years before the patient died, during nearly the whole of which time she pursued her usual avocations.‡ Dr. Baillie has given other singular examples; in one of which the spleen was three times its ordinary size, of a hard, but uniformly solid texture; not tuberculated, nor disposed to suppurate.§ When suppuration, however, takes place, the abscess is sometimes very bulky; and the quantity of pus lodged in it has amounted to fifteen pints. ||

The coats of the spleen are occasionally converted into a soft CARTILAGE, and exhibit a change which is rarely, if at all, found in other viscera. The enlargement in this case, beyond the natural size of the organ, is in general but trifling; and Dr. Baillie has an instance in which there was a diminution of size; the coats, though sometimes evincing irregularities on the surface, are usually smooth and uniform; and it is by these characters that we can alone judge of the nature of the disease during life. [Littre and Morgagni have seen the peritoneal investment of the spleen partially ossified.]

* Med. and Phys. Journ. ut suprâ. † Edin. Med. Journ. No. 80, p. 9.

‡ Class x. Ord. ii. Bonet. ex Hyppol. Bosco. § Morb. Anat. Fascic. vi. Pl. iii. || Hist. de l'Acad. des sciences, 1753, p. 196.

Acquires a large size, though less than in the preceding variety.

Illustrated.

Very bulky in suppuration.

γ P. splenicum cartilaginosa.

General character.

With regard to the treatment of scirrhus spleen, it is not necessary to add to the remarks already offered under the preceding species.

[The whole substance of the spleen is sometimes reduced to a soft mass of a dark colour, resembling a mass of coagulated venous blood, and breaking down under the slightest pressure after its peritoneal coat is laid open. In certain cases it is still softer, and of a pulraceous consistence, or even like a reddish mucus or pus. This change of the spleen is chiefly met with in old persons, or such as have passed the age of forty. Its exact cause is not known; but it has been met with in persons who died with scurvy, or of continued or intermittent fevers; or who had been afflicted with melancholy; experienced violent pain in the hypochondria and epigastric region; or had had symptoms of melæna; or laboured under ascites. Dr. Abercrombie* suspects, that it arises from inflammatory action. He has observed it, as the only morbid appearance in some obscure cases, which were fatal, with symptoms referrible to the stomach; or frequent vomiting, loss of appetite, tendency to costiveness, &c. the pulse remaining undisturbed.]

GEN. IV.
SPEC. II.
β P. splenicum scirrhosum.

SPECIES III. Parabysma Pancreaticum.—*Turgescence of the Pancreas.*

Hard elongated tumour, running transversely in the epigastric region; dyspepsy; general languor.

THE following are the chief varieties under which this species shows itself:

- | | |
|------------------------|---|
| α Coactum. | Chronic induration or enlargement. |
| Atonic turgescence. | |
| β Calculosum. | Accompanied with calculous concretions. |
| Calculous turgescence. | |

Diseases of the pancreas occur but rarely. [In many points it resembles the salivary glands, to which it is also analogous in the rarity of its morbid affections. This truth is confirmed by extensive observation, and when the surrounding viscera are found variously altered by disease, the texture of the pancreas often continues quite healthy. To say, however, that this organ is never diseased would be incorrect.

As Dr. Abercrombie observes,† inflammation of the pancreas seems to be a rare disease; but several cases are recorded by Barbette, Greisel, Tulpius, and Bartholine, where it was found suppurated and gangrenous. Pain, generally referred to the back, but sometimes resembling colic, attended the disorder. In a few cases there was vomiting; but it does not appear to have been a common symptom. Guido Patin found an immense abscess occupying the whole of the pancreas. Portal met with a similar case in a man, who died suddenly after two or three at-

* Edin. Med. Journ. No. 80, p. 2.

† Id. No. 79.

GEN. IV.
SPEC. III.
Parabysma
pancreaticum.

tacks of vomiting, followed by syncope. The same pathologist found the pancreas gangrenous in a man who died with obscure pain in the abdomen, accompanied by wasting and occasional nausea and diarrhœa. A gentleman, mentioned by Dr. Percival,* had jaundice and bilious vomiting; a tumour appeared on the epigastrium; his strength failed; blood and fetid pus were discharged by stool; and, in three months he died, gradually exhausted. The pancreas was found much enlarged, and contained a considerable abscess. The ductus communis was obliterated by the pressure.

The pancreas sometimes contains calculi. De Graaf found seven or eight in the pancreas of a man, who had long been liable to vomiting and diarrhœa. In one enlarged pancreas, Portal found twelve calculi, some of which were as large as nuts. In a case seen by Dr. Baillie,† the calculi consisted of carbonate of lime; in some other instances their composition has been phosphate of lime.

Dissections prove, that the pancreas is sometimes changed in its texture, size, and figure, in consequence of chronic diseases; but the symptoms are so vague and uncertain, that those which might serve for discrimination, have not yet been pointed out by the most intelligent physicians. No doubt the chief causes of this difficulty depend upon the deep situation of the pancreas, its inconsiderable size, its little sensibility, and the very important organs by which it is surrounded. The valuable researches of Dr. Abercrombie show the remarkable diversity of symptoms in chronic diseases of the pancreas. Of twenty-seven cases, which he found described by various writers, six were fatal, with gradual wasting and obscure dyspeptic complaints, without any urgent symptoms. In eight there was frequent vomiting, with more or less pain in the epigastric region; and thirteen were fatal, with long continued pain without vomiting. In some of these, the pain extended to the back; and in others it was very much increased by taking food. In several of the cases, there were dropsical symptoms; and in three or four there was jaundice, from the tumour compressing the biliary ducts. In the morbid appearances also there was great variety, the pancreas being in many of the cases much enlarged; in others in a state of scirrhus hardness, with very little enlargement. No distinct relation could be traced between the urgency of the symptoms and the degree of enlargement, which was very considerable in some examples in which the symptoms were slight and obscure; while hardness, with little or no enlargement, was noticed in some other cases, where the symptoms were defined and violent.]

Of the diseases appertaining to the present species, Dr. Baillie never met with more than the modifications specified at the commencement of this section.

All the ordinary causes that produce ATONY in the liver and

a P. pancreaticum coactum.

* Trans. of the King's and Queen's Colleges, vol. ii.

† Works, by Wardrop, vol. ii. p. 239.

spleen may affect the pancreas; but there is one that is peculiar to itself, and that is, an habitual excitement of the excretories of this organ by the daily use of tobacco, whether chewed or smoked, probably from a sympathetic action between the pancreatic and salivary glands, whose functions so closely co-operate, and whose secretions are so nearly alike. Dr. Darwin relates a case of this kind which terminated in the death of the patient, who had been for many years a great consumer of tobacco, chewing it all the morning, and smoking it all the afternoon.* The substance of the gland is generally hardened, though not determinately scirrhus; and its lobular appearance is preserved.

[With respect to the treatment of enlargements of the pancreas, general and local bleeding, the exhibition of purgatives, the application of a blister to the epigastrium,† and a course of alterative medicines, especially Plummer's pill, afford the best chances of benefit.]

In the calculous variety, the concretions are chiefly, and sometimes altogether, found in the excretory duct of the gland and its branches, which, in consequence, are often very much distended, and occasionally filled with them. They are usually of a white colour and very irregular shape, and by these characters, when discharged by the rectum, may be distinguished from gall-stones. As the duct is less sensible than those of the liver, the kidneys, or the bladder, it is not often that much pain or uneasiness is complained of, even when the passage, upon an examination after death, seems to have been long blocked up and upon a stretch.

Emetics, and such exercise as gives a general jar to the animal frame, as riding a hard-trotting horse, will contribute towards dislodging the pent-up concretions; and a free use of acids, acidulous drinks, and especially acidulous mineral waters, will have a tendency to dissolve them.

GEN. IV.
SPEC. III.

α P. Pancreaticum coactum.
Produced by an habitual use of tobacco.

β P. pancreaticum calculosum.

Calculi where lodged.

Pain obtuse, and why.

Treatment.

SPECIES IV. *Parabysma Mesentericum*.—*Mesenteric Turgescence*.

Indurated and irregular mass of tumours below the stomach yielding to the pressure of the hand; pale, bloated countenance; atrophy; the appetite seldom diminished, often voracious.

THIS species shows itself under the following modifications or varieties:

- | | |
|-------------------------|---|
| α Helminthicum. | Accompanied with hydatids or other worms. |
| Vermicular turgescence. | |
| β Strumosum. | Accompanied with scrofula; |
| Scrofulous turgescence. | mostly tubercular. |

* Zoonom. Cl. i. Ord. II, ii. 8. † See Crampton's case, in Trans. of King's and Queen's College, vol. ii. p. 138.

| | | |
|----------------------------|---------------------------|---|
| GEN. IV. | γ Scirrhum. | Accompanied with scirrhus. |
| SPEC. IV. | Scirrhus turgescence. | |
| Parabysma mesentericum. | δ Sarcomatosum. | Accompanied with fleshy excrescences. |
| | Sarcomatous turgescence. | |
| | ε Steatomatosum. | Accompanied with adipose excrescences. |
| | Steatomatous turgescence. | |
| | ζ Fungosum. | Accompanied with fungous excrescences.* |
| | Fungous turgescence. | |

Varieties often intermixed.

Chiefly a disease of infancy.

Predisposing causes.

Emaciation a necessary effect.

May terminate in atrophy or tabes.

The obstruction rarely total.

And hence life preserved for many years.

These varieties are often complicated by an union of one of them with several others. Thus the strumous modification is sometimes found to have sprouted with fungous caruncles; the sarcomatous evinces a scirrhus or indurated texture; and vermicles are occasionally found in most of them. It is chiefly a disease of infancy; and debility is the proximate cause; but the predisposing causes are numerous. Innutritious food, a chronic and exhausting sickness, invagination, an impure atmosphere, a scrofulous diathesis, may all pave the way. And when the chylopoetic organs are hereby weakened, the weakness will soon extend to the mesenteric glands, which will become tumefied, and exhibit a tubercular or other irregular surface to the feel. These symptoms grow daily more manifest; because, as the lacteals which enter them are now obstructed and impervious to the chyle, the whole frame becomes emaciated, the superincumbent fat and muscles waste away, and the coacervated glands rise towards the surface, occupy their place, and are covered with a meagre shrivelled skin alone. And hence any of the varieties of the present species may become a cause of atrophy or tabes; though both these species may also exist without such effect.

A total obstruction, however, to the course of the chyle from a parabysma of the mesenteric glands does not often occur, certainly by no means so often as is suspected. Mr. Cruikshank admits it to be "possible that children and grown persons may sometimes have died of such obstruction; but," he adds, "in such enlargement of the glands, if they ever take place, we should meet with the stagnation of the chyle in the first set of lacteals; yet I never saw such stagnation on any occasion whatever: but as stagnation of the lymph from obstructed lymphatic glands of other parts is said to have been seen, it may be possible that the chyle, from the causes mentioned, may sometimes have been prevented from getting into the blood-vessels."[†]

That a total obstruction to the course of the chyle does not necessarily follow upon very great enlargements of the mesenteric glands is certain, because many patients exist under this disease for a considerable number of years, in some instances not less than ten;[‡] and seem, even at last, to be carried off by

* In one case Mr. Wardrop found the mesenteric glands much enlarged, and converted into a soft medullary pulp. The patient had died of a large fungus hæmatodes of the thigh. In very rare examples, they have been found to contain earthy matter. See Baillic's Works, vol. ii. p. 180.

† Anatomy of the Absorbing Vessels, Part I. Conclus. p. 115.

‡ Sauv. Cl. x. Ord. II. ix. 6. † 3.

hectic fever, or some other cause of irritation, rather than by actual innutrition. In perfect quiet, and freedom from exercise of all kinds, and where the form has acquired its full range of growth, it is astonishing to see how very small a portion of food entering into the system is capable of supporting life: a subject we have already touched upon under *limosis experts*;* and hence Morgagni and Dr. Hunter are inclined to believe, that in old people the glands of the mesentery become obliterated; while Ruysch contended that, in the latter part of his life, he lived without his lacteals, and that old people in general do the same.

In most of the varieties before us the tumours are often very bulky and conglobated; and at times composed of, or accompanied with cysts filled with a limpid fluid. In one instance, related by M. de Sauvages, these amounted to twenty of various sizes; one as large as a child's head, six as large as a man's fist, and the rest equalling hen's and pigeon's eggs. Hence the whole abdomen is in some cases so generally tumefied as to give a semblance of pregnancy, for which the tumefaction has sometimes been mistaken. This is particularly the case with the last variety; and as the appetite, state of the bowels, and bladder are often unaffected, or only affected casually and to appearance capriciously, there is not unfrequently some difficulty in determining between the two. Sometimes the parabsysma is peculiarly complicated in its texture, which is glandular, tubercular, scirrhus, and ossific; the glands or tubercles appearing like clusters of walnuts, interspersed with glands of less magnitude of the size of peas, beans, or filberts: for the origin of which the reader is referred to the remarks under the first species. Dr. Donald Monro gives a case of this kind in a young woman, who died of hectic fever in St. George's Hospital in 1771. Upon laying bare the mesenteric glands after death, they were in some places found to resemble spongy carious bones; not consisting of one large firm piece of bone, but of a number of small pieces united by membranes.

The general outline of the medical treatment will run parallel with the plan already laid down for the cure of *parabsysma hepaticum*. If worms exist, the course recommended under the genus *HELMINTHIA* should be carried into effect, according to the kind of worm that discovers itself; a light, nutritious food, sub-stimulant with salt and acid or aromatic condiments, should form the daily repast, with a free exposure to pure air, and such exercise as the patient is best able to take without fatigue. Our chief dependence, however, must be on small doses of mercury, a mercurial plaster with gum ammoniac, large enough to cover the entire seat of disease; or a small portion of mercurial ointment rubbed over the abdomen every night and morning with the friction of the hand, continued for at least half an hour or an hour at each time; in which case the friction will be of almost as much service as the mercury. A salivation is not desirable, for it will only add to the general weakness; and

GEN. IV.
SPEC. IV.

Parabsysma
mesentericum.

Mesenteric
glands less
employed in
advanced
life.

In old persons
sometimes
totally want-
ing.

Tumours
sometimes
conglobated
or in cysts.

Often of va-
rious sizes.

Sometimes
very bulky.

Sometimes
both scirr-
hus and
ossific.

Medical
treatment.

Mercury in
different
forms.

But not to
produce
salivation.

* Cl. I. Ord. I. Gen. v. Spec. II. γ.

GEN. IV.

SPEC. IV.

Parabysma
mesentericum.Myrrh with
the fixed
alkalies.

Iodine.

Gentle
aperients.

hence whatever preparations are made choice of, they should fall short of producing this effect. The less stimulant and heating of the gum-resins will often also be found serviceable: and especially myrrh, either alone or in combination with the fixed alkalies; and especially with some form of iodine, which whether used externally as an ointment, or internally in the mode of pills or tincture, has a tendency to afford more relief, and prove a better deobstruent in this species of parabysma than in any other. The aperients employed should be gentle; and where calomel is not thought advisable from any particular circumstance that may occur, rhubarb alone, or in union with some of the neutral salts, will usually be found the best medicine we can have recourse to.

In chronic
cases success
rarely to be
hoped for.
Treatment.

Yet it is only in recent and uncomplicated cases that we can fairly hope for success, let our medical plan be what it may. In the scirrhus, sarcomatous, steatomatous, and especially the fungous modifications, and more especially still, where several of these are playing their parts simultaneously, the art of medicine may possibly retard, but can never entirely ward off, the fate that is approaching, with perhaps a slow, unperceived, and insidious, but, at the same time, with a certain and irresistible stealth of footstep.

SPECIES V. Parabysma Intestinale.—*Intestinal Turgescence.*

Tumour hard or circumscribed, round or elongated; moveable upon the pressure of both hands: irregular dejections: obstinate vomiting: pyrexia: and for the most part emaciation.

Seat of coacervation.

In this species the coacervation exists in the coats of the intestines, and consequently is moveable with them. Almost always, however, a slight degree of adhesive inflammation takes place, and the tumefied part becomes united to the superincumbent parietes, or to some other part of the intestinal canal; on which account the disease belongs to the present, rather than to the preceding Order. It has chiefly occurred under the two following modifications:—

α Conglomeratum.

Cohesive and conglomerated.

Conglomerate turgescence.

β Sarcomatosum.

The tumour circumscribed, and of a fleshy feel.

Sarcomatous turgescence.

α P. intestinale conglomeratum.

Illustrated from Morgagni.

Morgagni relates a striking instance of the FIRST VARIETY in a man subject to hypochondriacal depressions of mind, as well as to a flux of the hemorrhoidal vessels. Upon an abrupt cessation of the hemorrhage, he soon complained of pains in the abdomen, sometimes sudden and transitory, at other times protracted, but never leaving him intervals of perfect ease. Some months afterwards a hardness and swelling were noticeable in the belly, which gradually augmented, and from the pain and

emaciation, and almost incessant vomiting with which it was accompanied, at length exhausted and destroyed him. The tumour lay manifest to the sight as well as to the touch, of a circular shape, equidistant from the ensiform process and the navel, in its diameter about eight fingers' breadth. On dissection, the ileum and adjoining portion of the jejunum were found retracted upwards, coacervated, and firmly adhesive.*

GEN. IV.
SPEC. V.
α P. intestinale glomeratum.

[Inflammation of the peritoneal coat of the intestinal canal is very often followed by a close and more or less general adhesion of the bowels to one another. These adhesions are sometimes so numerous and intimate, that the intestines form only one mass, being inseparably blended with the substance connecting them together, and making, as it were, a kind of tube winding in the midst of the confused mass.†]

The tumour in the SECOND VARIETY is often of an oblong shape, and lies below the hypochondria, inclining towards the epigastric region, prominent, with unequal hardness. Fantoni relates a case of this kind in a boy, of a corpulent make, about ten years of age. It commenced with an excruciating pain in the belly, pyrexia, and vehement vomiting: and was soon followed by a tumour of the above description, but seated on the left side, in size resembling a prolapsed spleen. The patient, worn out by the violence of the symptoms, did not long survive. On dissection, every other part being found healthy, the colon under the stomach and towards the left side, for the length of the palm of the hand, was greatly indurated and distended, with a fleshy, fibrous, and peculiarly thickened tumour, which contracted the diameter of the gut,‡ and, if the boy had lived much longer, would in all probability have adhered, like the last, to the surrounding parietes.

β P. intestinale sarcomatosum.

From the violence of the symptoms, and the little prospect we have of allaying them, this disease is almost hopeless. It commences with a considerable irritability of the part of the intestinal canal that is affected, and the effusion, growth of new matter, distention, and, where it takes place, adhesion, add daily to the irritable state, augment the pain, and keep up the tendency to vomit and reject whatever is introduced into the stomach.

Pathology.

There are two indications to be followed up, and but two medicines that offer us any chance of success while holding the indications in view. Our first object should be to allay the irritability, and consequently the pain and sickness, which, after a free loss of blood by cupping, can only be attempted by opium, given in large and repeated doses, if necessary to the amount of ten, twelve, or even fifteen grains a day if the patient be an adult. Ten and twelve grains a day, for three weeks without intermission, I have myself prescribed with great comfort to the patient, and without stupor, or even sleep, the night being passed in a kind of refreshing revery, without a loss of consciousness at any time. The symptoms we thus

Indications of cure.

Large doses of opium often necessary for the first intention.

* De Sed. et Caus. Morb. tom. ii. Ep. xxxix. N. 21. 25. † See Meckel, Manuel d'Anat. tom. iii. p. 442. ‡ Fantoni, Obs. Med. Select. Obs. ii.

GEN. IV.
SPEC. V.
 β P. intestinale sarcomatosum.

Mercury in different forms for the second.

endeavour to combat, not only bring on sure destruction by the exhaustion they produce, but very considerably promote the enlargement of the tumour, and the extent of the adhesions. If we can succeed in keeping these in subjection for a week or two, it is possible, that the constitution may be broken in to submit to the new action produced by the change of structure, and the irritability may at length subside.

We should at the same time endeavour to counteract the morbid change of structure, and particularly to arrest its progress; which constitutes our second indication; and this can only be done by mercurial preparations. Small doses of calomel should, for this purpose, be combined with the opium, while mercurial ointment should at the same time be applied, night and morning, to the seat of pain, and persevered in to pyalism: for the case is urgent, and not a moment is to be lost. The warm-bath may perhaps afford a temporary relief; but no permanent good is to be expected from it. The bowels, however, may often be conveniently refreshed and evacuated by emollient, but at the same time laxative, injections. For the rest, the treatment may be conducted as already laid down under the first species.

[The editor thinks that, in this section, too many different diseases are comprehended under the two varieties, and that the divisions of the subject should have been more numerous. An advantageous basis for these divisions might have been derived from morbid anatomy, by which the various swellings and indurations of each particular texture of the bowels might have been determined. Thus the origin of the scirrhus alteration of the intestines in their vascular coat and glandulæ muciparæ, and its subsequent extension to the mucous and muscular coats, might have been explained, as the foundation of one variety. The thickened state, first of the mucous coat, and then of the peritoneal and muscular, from dysentery, with ulceration of the first mentioned membrane, being only effects, and not the original disease, did not necessarily require description here. But the thickened folds of the mucous membrane, caused by an accumulation of the cellular substance,* might have been enumerated as a variety strictly appertaining to this species.

The remark needs scarcely to be made here, that all organized fleshy indurations, thickenings, tubercles, adhesions, scirrhi, and fungoid swellings, of any portion of the alimentary canal, must be deemed beyond the power of medicine.]

SPECIES VI. *Parabysma Omentale*.—*Turgescence of the Omentum*.

Tumour indurated and diffused; frequently spreading over the whole of the abdominal region: dyspnœa: emaciation.

Indefinite and complicated.

THIS species is especially characterized by its extent, and the want of a definitive outline, by which it is particularly distin-

* See Baillie's Works, vol. ii. p. 159.

guished from the preceding. It is usually of a complicated texture; infarcted, scirrhus, tuberculate, and cartilaginous. It has been found of various shapes and magnitudes, from a weight of five pounds to that of twenty, twenty-five, thirty, and, in one instance, fifty-six pounds. In the last case, the patient, a female, appeared to be labouring under an ascites, so generally was the abdomen enlarged. She sunk, gradually worn out by atrophy and pains of various kinds: and on examining the abdomen, the tumour, occupying the entire cavity of the belly, instantly presented itself to view, enclosed in a pretty thick and stout membrane, chiefly adipose, partly scirrhus and glandular, with a cavity in its interior filled with a sordid and fetid sanies. Laterally and below, it adhered to the surrounding organs only slightly; but was so firmly fixed to the fundus of the stomach and parts adjoining, that it could not be separated without laceration.*

GEN. IV.
SPEC. VI.
Parabysma
omentale.

Sometimes
of an enor-
mous size.

Illustrated.

In some instances, the hardness has been almost stony;† in others, osseous;‡ sometimes loaded with many thousand glandules;§ and, in several of these, accompanied with excruciating pains.||

Sometimes
stony or
osseous.

Whatever benefit may be expected from medicine, is to be collected from the remarks already offered on the preceding species.

Treatment.

SPECIES VII. Parabysma Complicatum.—*Complicated Turgescence.*

The belly hard, elevated, and distended as though pregnant, and often supposed to be so; yet more or less knotty and unequal: respiration seldom impeded: for the most part, acute pain, nausea, obstinate vomiting and thirst.

SEVERAL of the preceding species are complicated as to the nature of the tumour with which the respective organ is affected; the present is complicated, as being compounded of various viscera, which are affected simultaneously. And hence, the symptoms must often differ in different individuals, according to the immediate seat of the disease and the nature of the tumour. The liver is, in perhaps all cases, more or less concerned: sometimes in connexion with the spleen, sometimes with the mesentery; sometimes with the stomach, or intestines; and sometimes with all together. Hildanus found the liver so enlarged as to pass beyond the false ribs of the left side, with the spleen equally enlarged,¶ and fixed to the adjoining lobe of the former organ. Hildenreich, in a woman of forty-five years of age, found the liver scirrhus, weighing fourteen pounds, with a fleshy excrescence in the mesentery, of the size

Tumour
compounded
of various
viscera.

The liver
almost al-
ways
concerned.

* Greg. Horst. Prob. x. Dec. vi.

† Panarol. Pentec. iii. Obs. 10.

‡ Mongin, Hist. de l'Acad. des Sciences, 1732.

§ Seger. Ephem. Gerin.

|| Huxh. Phil. Trans. vol. vii.

¶ Cent. ii. Obs. 45.

GEN. IV.
SPEC. VII.
Parabysina
complica-
tum.
Singular
instance of
complica-
tion.

of a child's head. This case was also farther complicated with jaundice.* Bartholine mentions a woman of elegant form, in the flower of her age, attacked with another modification of this disease, which at length destroyed her: when all the intestines, liver, spleen, and every adjoining viscus, were found intermixed, and buried in fat; the liver being at the same time enlarged and scirrhus, and filling both hypochondria; the stomach thickened and cartilaginous.†

A second,
from Baron.

Dr. Baron has given various examples of the same, both from earlier writers and from his own practice, of which the following is one of the most illustrative; the patient was a girl of about eighteen, and had laboured under the malady for several months before it proved fatal. "On opening the belly, it was found, that the whole of its contents adhered to each other and to the cavity in such a manner as to form apparently one solid mass. None of the viscera could be distinguished, till the thickened layers of the peritonæum were torn from their adhesions. It was impossible to do this from the intestines, for there the thickening and adhesions had proceeded so far, as to render any attempt at unfolding them impracticable. The mesentery and its glands were in a very diseased state: the latter were about the size of almonds, and had much of the same appearance when cut into. On separating the peritonæum from its adhesions to the diaphragm, the liver was found of a much larger size than natural; it was of a bright copper colour, and, like the intestines, it had lost its proper texture. The fingers pierced it in every direction without resistance, and it appeared like a part in a state of incipient putrefaction. On cutting through the right lobe, a lumbricus was observed in one of the biliary tubes."‡

Secondary
effects in
other
organs.

Various morbid changes, as adhesions, thickenings, tubercles, granulated masses, ulceration of the bronchial glands, and purulent discharge, were also observed in the thorax: for all the species of parabysina, when at length accompanied with inflammatory action, are peculiarly apt to spread not only from organ to organ, but from cavity to cavity; and more so from the abdomen to the chest, than the chest to the abdomen.

Rarely to
be cured,
though
sometimes
to be palli-
ated.

Other cases of a striking character are referred to in the author's Nosological Synopsis, which might be easily augmented if necessary; but the present are sufficient to give a general view of the nature, gigantic features, and mischievous effects, of this monstrous race of diseases: diseases, which we can rarely hope to conquer, unless we have an opportunity of strangling them in their infancy; though we may sometimes give a check to their rapid strides, palliate their painful progress, and postpone their fatal triumph.

* Miscell. Nat. Cur. Ann. vi. vii. † Cent. ii. Obs. 6. ‡ On Tuberculated Accretions, &c. p. 25, 8vo. 1819.

CLASS II. PNEUMATICA.

DISEASES OF THE RESPIRATORY FUNCTION.

ORDER I. PHONICA. *Affecting the Vocal Avenues.*

II. PNEUMATICA. *Affecting the Lungs, their Membranes or Motive Power.*

PHYSIOLOGICAL PROEM.

BEFORE we enter on the diseases which disturb the function of Respiration, and constitute our Second Class, it may be found advantageous to take a brief survey of the general nature of this function, and of the organs which form its instruments.

The respiratory function is maintained by a current of air, alternately thrown into and thrown out of the chest, and is subservient to two important purposes: that of furnishing us with speech, or the means of vocally communicating and interchanging our ideas; and that of carrying off from the blood a gas recrementory and deleterious to life, and possibly of introducing in its stead one or more gases indispensable to animal existence. It is these two purposes that lay a foundation for the two Orders, into which the Class before us is divided; the first entitled PHONICA, comprising the diseases affecting the VOCAL AVENUES; and the second, PNEUMONICA, comprising those affecting the LUNGS, THEIR MEMBRANES OR MOTIVE POWER.

Purposes of the respiratory function.
Speech.
Removal of a recrementory gas.
Hence two orders of diseases.

I. At the root of the tongue lies a minute semilunar bone, which, from its resemblance to the Greek letter ν or *u-psilon*, is called the *hyoid* or *u-like* bone; and immediately from this bone arises a long, cartilaginous tube, which extends to the lungs, and conveys the air backward and forward, in the manner and for the purposes already mentioned. This tube is denominated the trachea or wind-pipe; and the upper part of it, or that immediately connected with the hyoid bone, the larynx; and it is this larynx, or upper part, that alone constitutes the seat of the voice.

I. Vocal avenues.
Hyoid bones.
Larynx.

[The larynx is situated on the median line, and consequently, according to the doctrine of Bichat, it is regular and symmetrical in its form, like all the organs of animal life. Considered as the upper termination of the trachea, it forms a striking contrast with the lower extremity of that tube, which, consisting of the bronchiæ, and concerned merely with the functions of organic life, is made up of two lateral portions not resembling each other. The lateral portions of the larynx, on the contrary, are exactly similar. This symmetry is necessary for the harmony of its

Its symmetry.

I. Vocal
avenues.

functions; and a discordant voice would inevitably result from different organizations of the two sides, or from inequality in the powers of the muscles of the right and left sides.]

Its carti-
lages.

The tube of the larynx, short as it is, consists of five cartilages; the largest, and apparently, though not really, lowermost of which produces that acute projection, or knot in the anterior part of the neck, and especially in the neck of males, of which every one must be sensible, and which was formerly denominated *pomum Adami*, as though it had sprung up in consequence of Adam's having eaten the forbidden fruit. This is not a complete ring, but is open behind, the open space being filled up, in order to make a complete ring, with two other cartilages of a smaller size and power; and which, together, form the glottis, as it is called, or immediate aperture out of the mouth into the larynx.

Glottis.

Of these three cartilages, the first is named scutiform, or shield-shaped; the other two, arytenoid, or funnel-shaped. A fourth cartilage lies immediately over this aperture, and closes it in the act of swallowing, so as to direct the food to the *œsophagus*. From its position it is called *epiglottis*. These four cartilages are supported by a fifth, which constitutes their basis, is narrow before, and broad behind, and has some resemblance to a sealing-ring; on which account it is named *cricoid*, or annular. [It is situated between the two flat plates composing the thyroid or scutiform cartilage; and, upon its elevated posterior margin, the two little arytenoid cartilages are loosely articulated, so as to admit of free motion. The *chordæ vocales* are the two long edges of the *rima glottidis*, which meet together in front. They consist of a peculiar elastic substance, and reach from the fore part of the arytenoid cartilages to the thyroid cartilage. Hence, the size of the *rima glottidis* must necessarily be altered by every movement of the arytenoid cartilages. In the instrument of the human voice, the *chordæ vocales* are analogous to the various contrivances for producing vibration in musical wind-instruments.] The larynx is contracted and dilated in a variety of ways by the antagonist powers of different muscles, and the elasticity of its cartilaginous coats; and is covered internally with a very sensible, vascular, and mucous membrane, which is a continuation of the membrane of the mouth.

*Chordæ
vocales.*

Form and
diameter of
the glottis.

The form of the glottis, composed of three distinct cartilages, resembles that of a small box, with a minute aperture or *rima*. In adults this aperture is about ten or eleven lines in length, and two in breadth at its greatest diameter. It is, however, increased or diminished by the action of the arytenoid and cricoid cartilages; and in birds, and amphibials, is capable of being so completely closed as to prevent the smallest drop of water from penetrating it, except with the will. In this way, frogs confine the air in the lungs, and live without inspiration for considerable time.

Capable of
being per-
fectly closed
in birds and
amphibials.

[That the larynx is the primary organ, in which the original sound is produced, is proved by the voice being destroyed or modified by certain diseases and accidents. If an opening be made in the trachea below the larynx, so that no air shall pass

through the latter, no voice is produced; when, on the contrary, an opening is made immediately above the glottis, the voice is not affected. In Bichat's experiments, when the epiglottis was confined, or even cut away, the voice was not affected by it; though later observations tend to prove, that it really answers a particular purpose in the vocal apparatus, as will be presently specified. When the same eminent physiologist cut through the arytenoid cartilages, or divided the thyroid longitudinally, he found that the voice was annihilated.]

The organ of the voice, then, is the larynx, its muscles and other appendages; and the voice itself is the sound of the air propelled through, and striking against the sides of the glottis or aperture into the mouth. The shrillness or roughness of the voice depends on the internal diameter of the glottis, its elasticity, mobility, and lubricity, and the force with which the air is protruded. Speech is the modification of the voice into distinct articulations in the cavity of the glottis itself, or in that of the mouth or of the nostrils.

There is a difficulty, however, in determining by what means the air is rendered sonorous in the glottis, and various explanations have been offered upon the subject. The oldest is that of Galen, who supposed the calibre of the glottis to be alternately expanded and contracted; an idea revived in modern times by Dodart, who at the same time compares its action to that of a flute.* A second explanation is that of M. Ferrein, who supposes the variations of sound to depend upon variations of tension and relaxation in the ligaments of the glottis; and, in this view, such ligaments become vibrating chords, and the entire apparatus approaches the nature of a violin.† A third explanation is that of M. Richerand, who unites the two preceding conjectures, and supposes that the glottis is a wind and a chord instrument at the same time. To these explanations we may add that of Kratzenstein, who regards the glottis in conjunction with the whole length of the larynx as a kind of drum;‡ and that of M. Blumenbach, who views the former in the light of an Æolian harp.§

[Perhaps, the organ of the human voice is more correctly compared to a clarinette. The rima glottidis is the mouth-piece of the larynx, and corresponds with the reed in the clarinette, or with the lips of a player upon the flute. In pursuing the same simile, as Mr. Mayo has remarked,|| we look for a contrivance, analogous to the stops in the flute or clarinette, by means of which the tube may be shortened, or lengthened, and we find the effect produced by the alternate rising and falling of the larynx. When the larynx is raised, the vocal tube is shortened; when it is depressed, the vocal tube is lengthened.

In forming high, or acute sounds, a contracted state of the glottis, with tension of its ligaments are required; the air passes

I. Vocal
avenues.

Voice.

Its powers.

Speech.

Air, how
rendered
sonorous in
the glottis.
Hypothesis
of Galen:
and Dodart.
Hypothesis
of Ferrein :

of Richer-
and :

of Kratzen-
stein :

of Blumen-
bach.

* Mémoires de l'Académie, &c. 1700. † Id. 1741.

‡ Tentamen de Naturâ et Characteribus Sonorum Literarum Vocalium. 4to. 1781. § Instit. sect. ix. x. subsect. 155. || Outlines of Human Physiology, p. 333.

I. Vocal
avenues.

rapidly through the narrow opening, and numerous oscillations of its sides are produced. The whole larynx is carried upwards and forwards; and, when the most acute sounds are uttered, the head is thrown backwards, in order that the larynx may be elevated through a wider range. This elevation equals nearly half an inch for one octave. That the changes above-mentioned take place is proved, by placing the finger on the larynx, and uttering an acute sound, at which period the ascent of the organ may be plainly felt; by the comparatively acute voice of children and women, in whom the larynx is small, and the glottis consequently narrow; by comparative anatomy, which shows us, that the glottis is small and narrow in singing-birds; large and relaxed in animals, which utter deep sounds; by the blowing of wind-instruments, in which the opening for the passage of the air is always contracted in order to produce the high notes; and also by this general fact, that the sounds are always more acute in proportion as these instruments are of smaller size.

In the production of deep or base tones, an opposite state of parts is required; the larynx is carried downwards, and the head itself brought towards the chest. This descent, like the ascent, is about half an inch for an octave. In the male sex, where the larynx is larger, and the glottis consequently more ample, than in the female, the voice has habitually a deeper tone. Eunuchs and women may be taught to sing soprano, but not base. When very low tones are formed, in which the chordæ vocales are greatly relaxed, the production of sound ceases altogether. A human voice, that has been much exercised, can pass through about two octaves and a half in either direction from the middle; consequently, it has a range in the neck of nearly three inches. The minuteness of the change, capable of altering the tone, must seem truly wonderful, when we reflect, that the breadth of the rima glottidis does not exceed a line at its broadest part, and that the variety of tones is almost endless.*

The force with which the air is impelled into the flute, the clarinette, or the larynx, is regulated by the action of the muscles of the chest concerned in expiration.

One use of
epiglottis.

According to M. Magendie, one use of the epiglottis is to perfect the larynx as a musical instrument. The note of a clarinette, swelled beyond a certain degree of loudness, is apt to break into a higher note; now, Mr. Grenié discovered, that this imperfection may be remedied by the insertion of a tongue of elastic substance; and, in the organ of the human voice, the epiglottis is precisely such a contrivance.

That much difficulty, however, attends all the foregoing theories cannot be denied: this is rendered clear enough in a memoir by M. Savart,† who shows that the analogy between musical instruments and the organ of voice, is very imperfect.]

* See Art. Larynx in Rees's Cyclopædia.

† Magendie, Journ. de Physiol. tom. v. 369.

Those animals only that possess lungs, possess a larynx ; and hence none but the three first classes in the Linnéan system, consisting of mammals, birds, and amphibials. Even among these, however, some genera or species are entirely dumb, as the myrmecophaga, or ant-eater ; the manis, or pangolin ; and the cetaceous tribes ; the tortoise, lizards, and serpents ; while others lose their voice in particular regions ; as the dog is said to do in some parts of America, and quails and frogs in various districts of Siberia.*

I. Vocal avenues. Animals only that possess lungs possess a larynx. Yet of these some are naturally dumb. Perfection of the voice.

It is from the greater or less degree of perfection, with which the larynx is formed in the classes of animals that possess it, that the voice is rendered more or less perfect ; and it is by an introduction of superadded membranes or muscles, into its general structure, or a variation in the shape, position, or elasticity of those that are most common to it, that quadrupeds and other animals are capable of making those peculiar sounds by which their different kinds are respectively characterized ; and are able to neigh, bray, bark, or roar ; to pur, as the cat and tiger kind ; to bleat, as the sheep ; or to croak, as the frog ; which last, however, has a sac or bag, of a singular character, in the throat or cheek, directly communicating with the larynx, on which their croaking principally depends.

Whence the peculiar sounds of different tribes of animals.

The larynx of the bird class is of a very peculiar kind, and admirably adapted to that sweet and varied music, with which we are so often delighted in the woodlands. In reality, the whole extent of the trachea in birds may be regarded as one vocal apparatus ; for the larynx is divided into two sections, or may rather, perhaps, be considered as two distinct organs : the more complicated, or that, in which the parts are more numerous and elaborate, being placed at the bottom of the trachea, where it diverges into two branches or bronchiæ, one for each of the lungs : and the simpler, or that in which the parts are fewer, and consists of those not included in the former, occupying its usual situation, at the upper end of the trachea ; which, however, is still without an epiglottis ; both food and water being, as we have already observed, rendered incapable of penetrating the aperture of the glottis, by another contrivance. The lungs, trachea, and larynx of birds, therefore, may be regarded as forming a complete natural bag-pipe ; in which the lungs constitute the pouch and supply the wind ; the trachea itself, the pipe ; the inferior glottis, the reed or mouth-piece which protrudes the simple sound ; and the superior glottis, the finger-holes which modify the simple sound into an infinite variety of distinct notes, and at the same time give them utterance.

Larynx of birds exquisitely curious.

Forms a natural bag-pipe.

Here, however, as among quadrupeds, we meet with a considerable diversity in the structure of the vocal apparatus, and especially in the length and diameter of the tube or trachea, not only in the different species, but often in the different sexes of the same species, more particularly among aquatic birds. Thus the trachea is straight in the tame or dumb

Yet varies in the different genera and sexes.

* Blumenb. Comp. Anat. Ch. xv. † 193.—Camper. Phil. Trans. vol. lxi. 1779. p. 139.

1. Vocal
avenues.
Anas olor.
Anas
cygnus.
Spoon-bill.
Mot-mot
pheasant.
Duck.
Merganser.

swan (*anas olor*) of both sexes ; whilst in the male musical swan (*anas cygnus*), but not in the female, it winds into a large convulsion, contained in the hollow of the sternum. In the spoon-bill (*platalea leucorodia*), as also in the mot-mot pheasant (*phasianus mot-mot*), and some others, similar windings of the trachea occur, not inclosed in the sternum. The males of the duck and merganser (*anas* and *mergus*) have at their inferior larynx, a bony addition to the cavity which contributes to strengthen their voice.

Singing-
birds.

Among singing-birds, Mr. Hunter, who, at the request of Mr. Pennant, dissected the larynx of many distinct kinds, observes that the loudest songsters have the strongest muscles, and that the sky-lark has the strongest of the whole ; whose clear and vigorous note is often heard when he can no longer be followed in his ascent by the most penetrating eye. He observes also that, among this division of birds, the muscles of the male, following the same rule, are stronger than those of its respective female, whose voice is always less powerful. In birds that have no natural voice, he perceived no difference of muscular power in the larynx of either sex.

Hence ex-
traordinary
powers in
many kinds.
Thrush.
Nightingale.
Tuneful
manakin.

From this more extensive and complicated machinery in the vocal organ of birds, we find numerous species possessing powers of a very extraordinary kind. In many of them, as the thrush and the nightingale, the natural song is exquisitely varied, and through an astonishing length of scale. In the *pipra musica*, or tuneful manakin, the song is not only intrinsically sweet, but forms a complete octave ; one note succeeding another, in ascending and measured intervals, through the whole range of its diapason. There are various kinds that are capable of imitating the music of human art, and amuse us by acquiring national and popular tunes ; as the bull-finch, the linnet, and even the robin, when reared in a state of separation from all other birds ; whilst some, again, are capable of imitating human speech, as the parrot, the jay, and jack-daw, and, indeed, most of the psittacus and corvus genera ; a fact, which proves the possession of a powerful and retentive memory, as well as of a precise and delicate ear. A linnet, according to Mr. Pennant, was once taught the same at Kensington ; and even the nightingale is said to have talents for speaking equal to those for singing. But where is the man, whose bosom burns with a single spark of the love of nature, who could for a moment consent, that this sweet songster of the groves should barter away the touching wildness of its native notes for any thing that art has to bestow ?

Imitating-
birds.

Bull-finch.

Parrot and
crow kinds.

Nightingale.

Mocking
bird, its
wonderful
powers.

Yet, perhaps, there is no species among the class of birds that is more entitled to notice in a physiological survey, on account of its voice, than the *turdus polyglottus*, or mocking-bird. This is a sub-division of the thrush-kind ; its own natural note is delightfully musical and solemn ; but, beyond this, it possesses an instinctive talent of imitating the note of every other kind of singing-bird, and even the voice of every bird of prey, so exactly as to deceive the very kinds it attempts to mock. It is

moreover playful enough to find amusement in the deception ; and takes a pleasure in decoying smaller birds near it by mimicking their notes, when it frightens them almost to death, or drives them away with all speed, by pouring upon them the screams of such birds of prey as they most dread.

I. Vocal
avenues.

Now it is clear that the imitative, like the natural, voice has its seat in the cartilages and other moveable powers that form the larynx ; for the great body of the trachea only gives measure to the sound, and renders it more or less copious in proportion to its volume. It is not therefore to be wondered at, that a similar sort of imitative power should be sometimes cultivated with success in the human larynx ; and that we should occasionally meet with persons who, from long and dexterous practice, are able to copy the notes of almost all the singing-birds of the woods ; or the sounds of other animals ; and even to personate the different voices of orators and other public speakers.

Seat of the
imitative
voice.

Imitative
voice in
man.

One of the most extraordinary instances of this last kind, consists in the art of what is called VENTRILOQUISM, of which no very plausible explanation has hitherto been offered to the world. The practitioner of this occult art is well known to have a power of modifying his voice in such a manner as to imitate the voices of different persons conversing at some distance from each other, and in very different tones. And hence the first impression, which this ingenious trick or exhibition produced on the world, was that of the artist's possessing a double or triple larynx, the additional larynxes being supposed to be seated still deeper in the chest than the lowermost of the two that belong to birds ; whence, indeed, the name of VENTRILOQUISM or BELLY-SPEAKING. This rude and early idea M. Richerand was at one time strongly tempted to revive ; but a closer examination of the subject convinced him, that it could not be supported, and he abandoned it, without, however, offering any other sufficiently matured for examination. Mr. Gough has attempted, in the Memoirs of the Manchester Society, to resolve the whole into the phænomena of echoes ; the ventriloquist, on this hypothesis, being conceived to confine himself on all occasions to a room well disposed for echoes in various parts of it, and merely to produce false voices by directing his natural voice in a straight line towards such echoing parts, instead of in a straight line towards the audience ; who, upon this view of the subject, are supposed to be artfully placed on one or both sides of the ventriloquist. It is sufficient, in opposition to this conjecture, to observe, that it does not account for the perfect quiescence of the mouth and cheeks of the performer while employing his feigned voices ; and that an adept in the art, like M. Fitzjames, who exhibited a few years ago in our own country, or M. Alexandre of the present day, is totally indifferent to the room, in which he practises, and will readily allow another person to choose a room for him. Of M. Fitzjames, M. Richerand has given a particular account from personal examination. He observes, that he always made a strong inspiration before he

Ventrilo-
quism.

Description.

How ac-
counted for
formerly.

Not sup-
ported by
anatomy.

Other
modes of ex-
planation.

At like unsu-
ti-factory.

I. Vocal avenues.

commenced his performance, and could support his various voices till he required a fresh supply of air; thus evidently proving, that the inhaled air was expired, though not through the lips, but, as appears from another case, observed by M. Richerand, at least partly through the nostrils.

Explanatory suggestions of the author.

Ventriloquism an imitative art.

Consisting of voice produced in the glottis alone.

Varied perhaps in the structure or number of its muscles or cartilages.

Glottis the only organ employed in singing; and in the mock articulation of birds.

Natural language of animals.

Glottis conjectured by Monboddo to have been the chief organ in the articulate language of man in a rude state.

Glottis capable of supplying the tongue's place.

This explanation advanced by the author fourteen years ago.

Yet the means, by which the ventriloquist is enabled to modify his articulations into the semblance of distinct voices, still remains to be explained; and I shall hence beg leave to throw out a suggestion upon the subject. From various concurrent facts, ventriloquism appears to be an imitative art, founded on a close attention to the almost infinite variety of tones, articulations, and inflexions which the glottis is capable of producing in its own region alone, when long and dexterously practised upon; and a skilful modification of these vocal sounds, thus limited to the glottis, into mimic speech, passed for the most part, and whenever necessary, through the cavity of the nostrils, instead of through the mouth. It is possible, however, though no opportunity has hitherto occurred of proving the fact by dissection, that those who learn this art with facility, and carry it to perfection, possess some peculiarity in the structure of the glottis, and particularly in respect to its muscles or cartilages.

In singing, every one knows that the glottis is the only organ made use of, except where the tones are not merely uttered but articulated. It is the only organ employed, as already observed, in the mock articulations of parrots, and other imitative birds; it is the only organ of natural cries, constituting the language of all animals possessing a voice; and hence Lord Monboddo has ingeniously conjectured, that it is the chief organ of articulate language in its rudest and most barbarous style. "As all natural cries," says he, "even though modulated by music, are from the throat and larynx, or knot of the throat, *with little or no operation of the organs of the mouth*, it is natural to suppose, that the first languages were, for the greater part, *spoken from the throat*; and that what consonants were used to vary the cries, were mostly *guttural*, and that the organs of the mouth would at first be but very little employed."* To which I may add, that notwithstanding, in the ordinary use of speech, the tongue takes an auxiliary part among mankind, yet the numerous and well authenticated examples on record, and to which we shall have occasion to advert more minutely hereafter, of persons who have retained a full and perfect command of speech, after the tongue has been destroyed or extirpated, proves, incontrovertibly, that the glottis alone is capable of supplying, in this respect, the place of the tongue, upon particular occasions, and where perhaps peculiar pains are taken to call forth the full extent of its latent powers.

This explanation, which some hundreds of persons in this metropolis may remember to have been advanced by the author, in a public lecture on the subject delivered in the year

* Orig. and Prog. of Lang. v. i. b. iii. ch. 4.

1811, has since been embraced in France, though without adopting the hint, that the full perfection of the art may possibly depend upon some slight addition to the muscular organism of the glottis, in those who are thus highly endowed with it. And hence, M. Magendie asserts, that ventriloquism consists in nothing more than a delicate attention to the different effects or modifications of sounds or speech, thrown at different distances and through different modes of conveyance, and an exact imitation of them in a larynx of common formation and powers.

I. Vocal avenues.

A similar explanation advanced since by M. Magendie with only a slight variation.

“Les fondemens sur lesquels repose cet art sont faciles à saisir. Nous avons instinctivement reconnu, par l'expérience, que les sons s'altèrent par plusieurs causes; par exemple, qu'ils s'affoiblissent, deviennent moins distincts, et changent de timbre à mesure qu'ils s'éloignent de nous. Un homme est descendu au fond d'un puits, il veut parler aux personnes qui sont à l'ouverture: sa voix n'arrivera à leur oreille qu'avec des modifications dépendantes de la distance, de la forme du canal qu'elle a parcourue. Si donc une personne remarque bien ces modifications, et s'exerce à les reproduire, il produira des illusions d'acoustique, dont on ne pourra plus se défendre, qu'on ne peut pas voir les objets plus gros lorsqu'on les regarde à travers un verre grossissant; l'erreur sera complète s'il emploie d'ailleurs les prestiges convenables pour détourner l'attention.

“Plus l'artiste aura de talens, plus les illusions seront nombreuses: mais il faut se garder de croire qu'un ventriloque produise les sons vocaux, et articule autrement qu'une autre personne. Sa voix se forme à la manière ordinaire. Sous un certain rapport, on peut dire que cet art est à l'oreille ce que la peinture est pour les yeux.”*

But this last view of an ordinary articulation and formation of the voice, is at variance with that perfect quiescence of the muscles of the cheeks and lips which the more skilful ventriloquists evince, and which can only be accounted for by a formation of articulations, and not merely a modification of sounds in the larynx.

Single objection pointed out.

II. The lungs, whose vessels receive the air from the trachea, and in which the blood undergoes the important process of ventilation, are well known as a pair of large, light, elastic, and spongy organs, suspended by the tracheal tubes and large blood-vessels in the cavity of the chest, and in size adapted to the two sacs of the pleura, which they completely fill when inflated. They are surrounded by an exquisitely fine duplication of this delicate membrane, which lines the entire cavity of the thorax, and separates the lungs from each other by a process or septum; which, from its running between the two, is called mediastinum. [In opposition to what is commonly supposed, however, the same points of the two layers of the pleura are not always applied to each other; for when the lung expands, it slides upon the pleura costalis;† a fact, proved

II. Motive powers.
Structure of the lungs.

* Précis Elementaire de Physiologie, tom. ii. p. 235.

† See Mayo's Outlines, p. 85.

II. Motive powers. by the elongation of the adhesions so frequently existing between the lungs and inside of the chest.] The substance of the lungs is lobular; the larger lobes dividing into smaller, and the subdivision being continued through an almost infinite series, till the ultimate lobules terminate in very minute vesicles; which, after birth, though not antecedently, are filled with air, conveyed by an innumerable host of exquisitely slender ramifications from the two grand branches into which the trachea at first forks off, so as to form a main division for each of the lungs, and which are denominated bronchiæ, as their subdivisions are bronchial vessels. The vesicles or air-cells are invested and held in connexion by the mucous web, common to all animal organs, which, at the same time that it unites them and forms their boundaries, opens a communication between the one and the other, and is itself freely supplied with exquisitely fine blood-vessels, that are ramifications from the pulmonary artery, and continue to divide and subdivide, till they at length form a beautiful net-work upon the sides of the air-cells, and ultimately become invisible from their attenuation; by which means every particle of blood is exposed, in its turn, to the full benefit, whatever this may consist in, of the gases of the atmosphere, contained in the air cells which they thus surround.

Air vesicles. Different size of the air cells at different ages, and in health and disease. [M. Magendie found the air cells smaller in infants than adults, and less in adults than in persons of advanced age. From experiments of the same physiologist, it further appears that, as we grow older, the specific gravity of the lungs diminishes; and so remarkable is this change, that he found a piece of lung taken from a man sixty years of age, fourteen times lighter than a portion of lung of equal size taken from a child.*

This increase in the size of the air cells is generally so regular, that the age of the subject may be determined by it. However, in old persons, who retain their *embonpoint*, whose muscles are large, and whose hearts are necessarily of considerable size, the air cells do not undergo such an increase of dimensions. But the contrary happens in very thin old persons of broken constitutions, in whom the heart is almost always diminutive, and the quantity of blood scanty.

The size of the air cells is also modified by disease. In individuals who have coughed a great deal previously to death, they are generally larger. When such persons are aged, the air cells may be even two lines in diameter, without any vestige of laceration. The healthy lung of certain individuals, affected with phthisis on one side only, was found, when inflated and dried, to resemble light froth.

Effect in lessening the pulmonary capillaries. The preceding change in the texture of the lungs with the progress of age, has the effect of really lessening the number of capillary vessels, by which the blood from the right ventricle is transmitted into the pulmonary veins. In other words, the surface by which the venous is converted into arterial blood,

and from which pulmonary exhalation takes place, is thereby diminished. The only remedy for this imperfection would be a quicker pulse, in order that as much blood might be sent in a given time, through the lungs of an old, as through those of an adult subject. But unfortunately, as Magendie has observed, the heart beats more slowly in the aged than in other individuals. From these facts, it seems probable, that the old person must consume less oxygen than the young; that his animal heat must be less; and his ability to resist cold very inferior.]

II. Motive powers.

The moving powers of the lungs consist in the bones, cartilages, and muscles by which they are encircled. The bones are the ribs and sternum, which, in their form, insertion, and general freedom of play (for even the sternum itself seems to yield a little), exhibit a perfection of art that the most careless among us cannot but admire, though the wisest could not have contrived:

Division of moving powers.

Deus, Deus, ille, Menalca!

Antecedently to birth, the whole of this machinery, with the blood-vessels, may be contemplated as at rest, and the lungs in a state of collapse, in whose interstices there is a perfect vacuum. From the moment the infant becomes exposed to the atmosphere, the air which presses forcibly on every side, presses also upon the upper part of the trachea through the channels of the mouth and the nostrils; the motive powers of expansion, and which are afterwards those of expiration, are immediately stimulated into action; the ribs rise by the agency of the intercostal muscles, and the chest becomes elevated; the diaphragm, whose broad and muscular septum divides the thorax from the abdomen, sinks, from instinctive sympathy, towards the viscera beneath, and the chest becomes deepened; and into the dilated vacuum, hereby produced, the external air rushes forcibly by the trachea, and, by inflating the lungs to the full stretch of their elasticity, compresses all the surrounding organs. Yet as the force, with which the air operates, is very considerably less than that of the heart when stimulated to contract, the blood, instead of being hereby impeded in its course through the pulmonary vessels, flows far more freely, and dilates these vessels by its plenitude, as they are already necessarily elongated by the expansion of the lungs; and the heart in this manner becomes liberated from a load, which, if it were to remain in its cavity, would oppress it and put a stop to its action. And hence we behold at once, the important connexion that exists between the sanguiferous and the respiratory systems, and how much the soundness of the one must depend upon that of the other.

State of the lungs antecedent to birth.

Inspiration how produced.

Such, then, are the chief motive powers concerned in the act of inspiration, and the means by which they effect their purpose. The process of expiration, or that of throwing the air back again after it has accomplished its intention, is not of more difficult comprehension. [The muscular contraction of the diaphragm and intercostals having ceased, is succeeded by a short relaxation, the elasticity of the cartilages of the ribs and texture

Expiration how produced.

II. Motive powers.

of the lungs, occasionally aided by the muscles of the belly and loins, reduces the chest to its former dimensions; and as the capacity of the lungs is thus diminished, some of the air in them is expelled. In a little while, the contraction of the diaphragm and intercostals is renewed, and is again followed by relaxation: this alternative proceeding as long as life continues.]

Antagonism of the moving powers in inspiration and expiration.

Now this is precisely the state of the moving powers of the lungs, in the two alternate actions of inspiration and expiration. For while the muscles we have just adverted to are stimulated to expand the chest, there are others that, by a reverse energy, are perpetually striving to contract its diameter. Almost all the abdominal muscles tend to produce this effect, and particularly the oblique, straight, and transverse. Many of these are inserted into the ribs; and as the latter become elevated, endeavour to draw them back into their anterior situations, to which also the ribs themselves have an inherent inclination to return, from their natural elasticity. Other muscles, urged into action by the descent of the diaphragm, immediately contract their fibres, diminish the convexity of the abdomen, and hereby force the abdominal viscera upwards and backwards against the diaphragm that thus intrudes upon them, and drive it into its former position: whilst all the blood-vessels, and even the air-cells of the lungs, possessing an elastic power, have a natural tendency to return to their smaller diameters; and hence expiration is performed with even more facility than inspiration, and is consequently the last action of dying persons.

[In ordinary breathing, expiration is conceived by some physiologists to be, in a great measure, a passive operation, depending principally upon the elasticity and other physical properties of the organs concerned. This, however, is supposed to be the case only in the quiescent easy state of respiration, without exertion. Though the function cannot be altogether suspended by any voluntary effort, the degree in which it is carried on may be influenced and altered by the will. Thus, as Dr. Bostock notices, when we wish to make a full inspiration, we call into action, besides the diaphragm and intercostals, the external muscles of the breast, shoulders, and other neighbouring parts, which, by elevating the ribs and the sternum, increase still farther the capacity of the chest. When, on the contrary, we wish to produce a full expiration, the abdominal muscles contract, the viscera are pushed up against the diaphragm, and its convexity towards the thorax is augmented.*]

Function accomplished chiefly without the interposition of the will.

Yet on emergencies the will controls and

The powers I have thus far noticed are those which usually act without the interposition of the will, although the will possesses some control over most of them. But whenever this faculty of the mind co-operates and throws its influence into the balance on either side, other powers are sometimes called into action, and the energy of some of these is occasionally suspended. Thus, in the case of a fractured rib, or of pleurisy, the power of the will keeps the ribs quiescent, and the power

* See Bostock's Elements of Physiol. v. ii. p. 8.

of expansion is thrown almost entirely upon the diaphragm; while, on the contrary, when, in running, a freer supply of air becomes necessary, and the heart palpitates from the rapidity with which the blood is thrown into it, the thorax is urged by the stimulus of the will to a quicker respiration, and the muscles that are inserted into the clavicles and scapulæ are often called upon for their conjoint assistance. And where the mind has, from an early period of life, been in the habit of exercising such a control, it is wonderful to contemplate the quantity of air which the lungs may be brought to enclose, and the length of interval through which the life may be preserved without a fresh supply: of which savage nations furnish us with striking examples, in the act of diving and remaining under water. Diermerbroeck relates the case of a pearl-diver, who, under his own eyes, remained half an hour at a time under water, while pursuing his hunt for pearl muscles.*

The will also makes use of the muscles of respiration for a variety of other purposes; sometimes for that of freeing the aerial passages themselves, or other cavities connected with them, from some material that irritates or loads them, as in coughing or sneezing, which actions are sonorous from the violence with which the air is protruded. Hiccup, which is a quick, convulsive contraction of the diaphragm, is generally exercised, even without the consent of the will. And sometimes the will employs these powers as mere expressions of mental feeling at the moment, as in laughing, sighing, or weeping: the first of which consists of a mere succession of short and abrupt expirations; and the last two, of deep inspirations, succeeded by deep expirations; broken, in the case of weeping, into a quick series of sonorous snatches; and often accompanied, in sighing, with deep and long drawn intonations, which we call groans.

[Dr. Barry has endeavoured to demonstrate, that, in the ordinary process of respiration, the venous half of the circulating system derives considerable assistance from the action of the atmosphere on the cavity of the thorax. His experiments, as he conceives, prove the two following facts:

1st, That the cavities of the great veins within the thorax, and all the thoracic cavities, draw towards them the fluids with which they are placed in direct communication.

2dly, That this attraction, or suction, never takes place but during the expansion of the thorax, that is, during inspiration.

From these facts he deduces various inferences, amongst which the two subsequent ones need only be noticed here:

1st, That the blood, *which runs against its own gravity*, arrives at the heart only during inspiration.

2dly, That the power, which impels it at this moment through the veins, is atmospheric pressure.†

II. Motive powers.

varies the action of the moving powers in respiration;

and sometimes directs them to other purposes;

as in laughing, sighing, and weeping.

Effects of atmospheric pressure on the venous circulation in inspiration.

* Anatom. lib. ii. p. 464.

† See Barry's Exp. Researches on the Influence of Atmospheric Pressure upon the Progression of the Blood in the Veins, &c. 8vo. Lond. 1826. p. 35.

II. Motive powers.]

Influence of the phrenic nerves.

The nerves, whose influence is principally connected with the function of respiration, are the phrenic and par vagum. If the spinal cord be divided above the origin of the phrenic nerves, respiration suddenly ceases, but the action of the heart remains without any immediate change. If the same nerves be cut through in a living animal, the diaphragm becomes paralytic, and respiration is only imperfectly carried on by means of the muscles, which raise and depress the ribs.

Influence of the par vagum.

When the nervi vagi are divided in the middle of the neck, the breathing is instantly and seriously impeded, and death soon follows. This is supposed to depend upon the paralysis of the muscles, whose function is to open the glottis. In an ass, upon which this experiment has been performed, the breathing became easy as soon as an incision was made in the trachea. From certain investigations made by Mr. Brodie,* it appears, that, when the par vagum is divided, the quantity of carbonic acid produced by respiration is lessened. It is curious to learn, from the experiments of Dr. W. Philip, that the difficulty of breathing, caused by the annihilation of the nervous influence of the par vagum, may be temporarily removed by galvanism.]

III. Effect of respiration on the blood.

III. But the most important part of the general economy of respiration consists in the change which takes place in the blood in consequence of its being acted upon by the inspired air.

Character of the blood before it reaches the lungs.

We see the blood conveyed to the lungs of a deep purple hue, and deprived of those qualities which fit it for nutrition, secretion, the preservation of the nervous influence, and the maintenance of the vigorous action of every part and organ; or immature and unassimilated to the nature of the system it is about to support, in consequence of its being received fresh from the trunk of the lacteals. We find it return from the lungs spirited with newness of life, perfect in its elaboration, more readily disposed to coagulate, and the dead purple hue transformed into a bright scarlet. What has the blood hereby lost? How has this wonderful change been accomplished?

Character afterwards.

The subject studied in former, as well as in modern times,

These are questions which have occupied the attention of physiologists in almost all ages, and were as eagerly studied in the Greek schools as in our own day. To the present hour, however, they have descended in a mantle of Cimmerian darkness; and though the researches of a more accurate chemistry have disclosed volumes of facts heretofore unknown, and the ingenuity of able theorists have laid hold of them, and applied them to an explanation of this curious subject in a great variety of hypotheses, I am afraid we are still almost as much at sea as ever; and that there is no enquiry in the whole range of physiology in a more unsatisfactory state, than that concerning the ventilation of the blood in the lungs.

but still in an unsatisfactory state.

Average of inspirations in a minute, according to Davy.

According to a course of well-conducted experiments, instituted many years ago by Sir Humphry Davy, it appears, that the general sum of a man's natural inspirations are about twenty-six

* Phil. Trans. vol. cii. p. 390.

or twenty-seven in a minute; and that thirteen cubic inches of air are, in every inhalation, taken in, and about twelve and three quarters alternately thrown out. The atmospheric or inspired air was found to contain, in the thirteen cubic inches, nine and a half inches of nitrogen, three and four-tenths of oxygen, and one-tenth of an inch of carbonic acid; the twelve inches and three quarters of returned air gave nine and three-tenths of nitrogen, two and two-tenths of oxygen, and one and two-tenths of carbonic acid.

III. Respiration.

Contents of inspired air; of expired air.

[Perhaps, in the foregoing statement, the quickness of ordinary respiration is much exaggerated. Laennec says, that the breathing may be considered natural when the number of inspirations, in the state of repose, is from twelve to fifteen in a minute.* In the latest works on physiology, its frequency is said to vary between fourteen and twenty-seven times in a minute, but the average rate to be from seventeen to twenty.† In the healthy state of the system, Dr. Bostock‡ observes, that we respire, upon the average, about twenty times in a minute, while the average velocity of the pulse may be reckoned at eighty; and, consequently, the heart contracts four times during the completion of each movement of respiration. The editor's observations lead him to regard Laennec's estimate as most correct.]

Average frequency of respiration and the pulse.

From the experiments of Sir Humphry Davy, therefore, there should seem to be a retention in the system of a large portion of the inspired oxygen, and a small portion of the inspired nitrogen; and a discharge from the system of a very considerable portion of carbonic acid gas. And as the colour of the blood is well known to be changed in its passage through the lungs, from a deep modena to a bright scarlet hue, M. Lavoisier, following up, with additional facts, an earlier set of experiments of Dr. Crawford, endeavoured to show, that, while the modena hue is produced by the carbon with which the blood is loaded when it first reaches the lungs, its scarlet results from its losing this surplus of carbon, and acquiring oxygen in its stead; during which process a very large quantity of caloric, or heat, in an elementary form, is supposed, also, to be disengaged from the air thrown into the air-cells of the lungs, and to pass into the adjoining minute blood-vessels in combination with the oxygen.

Result.
Modena hue of the blood, how produced, according to Lavoisier. Scarlet hue, how produced.

[The quantity of oxygen lost by air that has been respired varies considerably, not only in the different kinds of animals, but in different animals of the same species, and even in the same animal at different times, according to the operation of certain external agents, and particular states of the constitution and functions. Under ordinary circumstances, a man consumes, on the average, about 45000 cubic inches, or nearly 15,500 grs. of oxygen in twenty-four hours.§]

* Laennec on Diseases of the Chest, and on Mediate Auscultation, p. 13. Transl. by Dr. Forbes. ed. 2d. † See Mayo's Outlines, vol. i. p. 87.

‡ Element. Syst. of Physiology, vol. ii. p. 56.

§ See Bostock's Elements of Physiology, vol. ii. p. 110.

III. Respiration.

Doubts as to a retention of any part of the inhaled nitrogen.

Doubts as to the existence of caloric as a distinct substance:

thus reviving the controversy of the Peripatetics and the Epicureans.

Doubts as to the entrance of the inspired oxygen into the blood.

How disposed of according to Ellis, who admits the substantive existence of caloric; and ascribes to it the scarlet hue of the blood.

Chief facts and arguments in support of Ellis's hypothesis.

No proof of any æriiform fluid in the blood.

The experiments of Sir Humphry Davy were afterwards repeated by Messrs. Pepys and Allen; but these acute analysts could not discover, that any part of the inhaled nitrogen was retained; since the same exact proportion appeared from their trials to be thrown back in every instance of expiration, as had been previously received in every instance of inspiration. And there have since been doubts, on the part of Sir Humphry Davy himself, respecting the supposed caloric; not merely in regard to its separation from the atmospheric air, but as to its substantive existence at all, either there or elsewhere; heat being, in his later view of the subject, nothing more than a rapid, vibratory, or repulsive action of the corpuscles of a body that exhibits this phenomenon: thus reviving the doctrine of Aristotle and the Peripatetics, which was so ably controverted by the Epicureans; who, foretasting the spirit of the Lavoisierian system, strenuously contended that it was a substance *sui generis*.* While, to close the whole, Mr. Ellis has gone through another extensive range of enquiry, and instituted another numerous set of experiments, to prove, that even the oxygen of the inspired air does not enter into the blood-vessels of the lungs, but becomes itself converted, in the air-cells of these organs, into the carbonic acid gas of the expired air, by uniting with the carbon of the blood, which he supposes, as acrement, to be secreted, in the form of a vapour, into the air-cells, by the exhalants of the lungs.† He admits, however, the existence of caloric, as an elementary principle; conceives it to be disengaged in very large abundance, from the inspired air, during its union with the secreted carbonic halitus; and ascribes the recovered scarlet hue of the blood to its combination with this invisible fluid; as he does also whatever effects are produced by the exercise of the respiratory function, not merely in animals, but in plants.

Of the facts and arguments in favour of Mr. Ellis's hypothesis, which he extends to plants as well as to animals, the two following seem to be the chief. Firstly, the seeds of plants in germination, and plants themselves in growth, throw forth carbon in the form of aqueous vapour, or, in other words, dissolved in water, even where no oxygen is present.‡ And, secondly, such ejected fluid, wherever life exists, is the work of secretion. In consequence of which, he ventures to affirm, that it is a secretion of this kind which is continually taking place on the surface of the lungs, and of the skin, in animals, both which, he thinks, concur in a common action; and, in support of this opinion, he refers to various insects and worms, without stigmata or stemmata, which appear to breathe by the pores of the skin alone.

According to Mr. Ellis, we have no proof of carbonic acid, or of any æriiform fluid existing naturally in the blood,§ and conse-

* See the Author's Translation of Lucretius. Note on book ii. v. 743.

† Inquiry into the Changes induced on Atmospheric Air, 8vo. 1807.

‡ *Idem*. sect. 20, p. 23.

§ *Ibid*. sect. 98, p. 122.

quently have no reason to expect that any can be thrown out : III. Respiration. while, if oxygen enter from the air-cells into the system, it must be by absorption, or chemical affinity. If by absorption, it would, in animals, take the regular course of the thoracic duct, and the blood in the right ventricle of the heart would first exhibit a scarlet hue : while, in the germination of vegetables, their seeds give no evidence of possessing a structure fitted to absorb and expel æriform fluids ; nor of any such fluids at any time existing in them.* To the operation of chemical affinity, he conceives an actual contact between the air and the blood to be requisite ; but in the lungs we have an intervention of the coats of the cells, and of the blood-vessels. And if these be presumed so thin that, when moist, they will allow the air, or its oxygen gas, to pervade them, the gas would rather pass into the interstices of the cellular substance, than into the pulmonary vessels, and thus create an emphysema. But the whole of such permeation, he holds to be gratuitous, and contrary to experiment.† The diminution in the bulk of respired air (calculated by Dr. Bostock to be on the average about $\frac{1}{80}$ of its bulk,)‡ he thinks, may be accounted for by a union of the carbon of the blood with the oxygen in the air-cells, and the formation of aqueous vapour by the disengagement of the caloric from the oxygen of the atmospheric air.§

To these objections, however, it may be replied, that if caloric can penetrate animal membranes, and unite, by chemical affinity, with the blood in the blood-vessels, so, for any thing we know to the contrary, may oxygen. [Dr. Davy found that, in certain morbid conditions of the chest, the pleuræ had the power of absorbing, and probably of exhaling air ; and such absorption extended likewise to air purposely introduced between these membranes in their healthy state. Hence he inferred, that mucous membranes may generally possess the power of absorbing and exhaling air ; and that these operations naturally belong to the process of respiration.||] Mr. Porrett has shown, that the voltaic fluid, when operating upon water, is capable of carrying even water itself through the bladder, and raising it into a heap against the force of gravitation.¶ A like combination may take place between the voltaic or some similar fluid and the oxygen and a part of the nitrogen gases, in the air-cells of the lungs ; and a similar permeation may follow directly through the membranes of the blood-vessels ; and the carbon of the system may, in consequence, pass off by the same channel, instead of being secreted ; and in the form of carbonic acid, instead of in that of carbonic vapour.

Next, we have no proof that carbon will dissolve in water, and produce such vapour ; and hence, at present, this idea is gratuitous.

* Inquiry into the Changes induced on Atmospheric Air, sect. 16, p. 18.

† Ibid. sect. 101, p. 125. ‡ Elem. Syst. of Physiol. vol. ii. p. 112. § In-

quiry into the Changes induced on Atmospheric Air, sect. 83, p. 99 ; sect. 107, p. 132 ; and compare with sect. 11, p. 13. || Phil. Trans. 1823, p. 496.

¶ Thomson's Annals of Philosophy, No. 43, pp. 75, 76.

Reply to
Ellis's ob-
jection.

Objections
to several of
his princi-
ples.

III. Respiration.

Facts seeming to show that air does exist naturally, both in animal and vegetable juices
Experiments of Bauer.
Experiments of Brande.

Conjecture of Sir E. Home.

Hence observations of Ellis not conclusive.
Later experiments of Gay Lussac and Magendie.

Again, air appears, in various cases, to have been actually disengaged, and is, perhaps, perpetually disengaging from the blood. Mr. J. Hunter declares he has discovered it in an abscess, in which it could neither have been derived from without nor from putrefaction;* and he hence adopted the opinion that air is often secreted by animal organs, or separated from the juices conveyed to them.† And this opinion has not only been abundantly confirmed, but even extended to the vegetable world since his time; for Mr. Bauer appears to have shown that an elastic gas is constantly shooting forth in small bubbles from the roots of plants into the slimy papulæ by which they are surrounded; and that it is hence the slimy matter becomes elongated, and is rendered vascular, or converted into hair or down. And Mr. Brande instituted experiments tending to prove, that carbonic acid does exist, and that, too, in a considerable quantity, in the blood of animals, while circulating through both arteries and veins; and that it is so largely poured forth from blood placed, while warm, under the receiver of an air-pump, as to give the appearance of effervescence; a fact familiar to Mr. Boyle nearly two centuries ago. The venous and arterial blood, according to Mr. Brande's experiments, seems to contain an equal proportion of this gas; and he calculated, that not less than two cubic inches were extricated from every ounce of blood thus experimented upon. And hence Sir Everard Home, following up the discoveries of Mr. Bauer, ingeniously conjectures, that it is by the escape of bubbles of this gas from the serum of blood, in cases of effusion and coagulation, that new vessels are formed; as also granulations in pus, as a like gas appears to be separable from this latter fluid.‡

[In opposition to the foregoing observations, it must here be mentioned, however, that Dr. John Davy has arrived at a conclusion entirely different from that of Mr. Brande, namely, that no free carbonic acid exists in the blood. In the spontaneous coagulation of this fluid and in that of the serum by heat, he never observed carbonic acid to be disengaged; nor has he been able to procure carbonic acid gas from blood just taken from the vessels, still warm, and placed under a receiver, and completely exhausted of air. He states, that he has raised the temperature of the blood and serum to blood-heat, and coagulated both by heat of 200° Fahrenheit, without a particle of gas being extricated.§ This discrepancy, between philosophers of such eminence, seems to demand a careful repetition of their experiments by others.]

After what has been stated, the observations of Mr. Ellis are by no means sufficient to subvert the Lavoisierian hypothesis of respiration. And some late experiments, both of M. Gay Lussac and of M. Magendie, tend to support those of Sir Hum-

* Animal Economy, p. 207. † See various facts in confirmation of this view in Dr. Davy's "Observations and Experiments on Air found in the Pleura, &c." Phil. Trans. 1823, p. 496. ‡ Phil. Trans. for 1818, p. 180. § See Edin. Med. and Surg. Journal, No. 95.

phy Davy, since they concur in proving, that, in the act of respiration, there is a little more carbonic acid gas than oxygen consumed. III. Respiration.

Since the first edition of this work was printed, the objections here offered to Mr. Ellis's conclusion, and the support thus attempted to be given to M. Lavoisier's hypothesis, have been amply and very plausibly supported by a new set of experiments, conducted with the utmost accuracy, and upon a far more extensive scale than ever, by Dr. Edwards of Paris, who is fairly entitled to be regarded as one of the clearest and ablest physiologists of the present day. [The doctrine, that the essential part of respiration is the union of the carbon of the blood with the oxygen of the atmospheric air, and the consequent formation of carbonic acid, implies that the carbonic acid produced in breathing is precisely equal to the volume of oxygen lost. Although this was maintained to be the fact by Allen, Pepys, Ellis, Magendie, and others, the experiments of Dr. Edwards may be considered as a decided refutation of the theory. According to this eminent physiologist, the excess of oxygen, consumed in respiration, above the volume of carbonic acid gas produced, varies from nearly one-third of the oxygen that disappears to almost nothing. The variation depends upon the species of the animal employed; upon its age, peculiarity of constitution, and condition at different periods.* Hence a different theory of respiration. Part of the oxygen that disappears may be absorbed in the lungs, and the remainder may either combine with the carbon of the blood, and form carbonic acid, or the whole of the oxygen may be absorbed, and the expired carbonic acid be a new secretion. The latter hypothesis is espoused by Dr. Edwards. When, in the month of March, frogs are immersed in pure hydrogen for eight hours, after all the air in their lungs has been pressed out, they continue to breathe, though less and less vigorously, and emit carbonic acid. The same fact was observed in kittens subjected to a similar experiment. A doubt has been suggested whether the carbonic acid came from the lungs, because it is exhaled when frogs are placed in hydrogen in the summer months, and breathe rarely, or not at all. It is also argued, that, even supposing the carbonic acid were derived from the lungs in these experiments, it may not be exhaled by the lungs in the natural state of respiration. On the whole, however, Dr. Edwards's views must be allowed to rest on facts not readily admitting of any other interpretation than what he has given them.] The experiments of the same distinguished physiologist also prove, that nitrogen gas is exhaled, and likewise absorbed. The carbonic acid is sometimes equivalent to the oxygen which disappears, but sometimes also it is less; and the nitrogen gas exhaled is sometimes inferior, sometimes equal, and sometimes superior, to the quantity absorbed.

Later and more accurate experiments of Edwards in confirmation of the views here offered.

The quantity of air, inhaled in a single act of inspiration, is

* De l'Influence des Agens Physiques sur la Vie, &c. p. 418. Paris, 1824. 8vo.

III. Respiration.

Quantity of inhaled air varies in different persons in a single inspiration, but not much in an aggregate period.

And hence the different results of different analysts are reconciled.

found to vary in persons of different sized chests; but the aggregate inhaled in a given period does not essentially differ; since those, who inhale most at a time, make the fewest inspirations in a minute. I have said that Sir Humphry Davy calculated the average number of respirations in a minute at twenty-six or twenty-seven, and that the measure of air inspired or expired was estimated at about thirteen cubic inches each time. This breathing has since been supposed too rapid for a common standard; and the measure of air received and returned too low; but, as the former error compensates the latter, the amount of air does not essentially deviate from the general allowance for a minute. And it is by this explanation alone that we can in any way reconcile the different results, which have been given by different experimenters upon this subject. Dr. Godwin calculated the inspired air at twelve cubic inches, and the expired at fourteen, being a difference produced by expansion from the heat of the lungs;* which does not essentially vary from the above estimate of Sir Humphry Davy; and he calculated the residuary air in the lungs, immediately after expiration, at one hundred and nine cubic inches, which, upon inspiration, was increased to one hundred and twenty-three. But Borelli states the inspired air at from fifteen to twenty cubic inches;† while Jurin, Haller, and Menzies give that which is expired at not less than forty.‡

About twenty inspirations in a minute in quiet and sound health. From 26 to 32 cubic inches each time: rendered 40 or 41 in the chest.

In good health, perfect quiet, with an open chest, few persons, perhaps, are found to breathe more frequently than about twenty times in a minute; and the quantity inhaled and exhaled, at a temperature of fifty-five of Fahrenheit, is estimated at from twenty-six to thirty-two cubic inches each time; which, however, by the heat of the lungs, and saturated with moisture, become forty or forty-one cubic inches in the chest itself. Taking, then, twenty cubic inches as the ordinary quantity of external air inhaled and exhaled about twenty times in a minute, it will follow that a full-grown person respire twenty-four thousand cubic inches in an hour; or five hundred and seventy-six-thousand cubic inches in the course of a day; a total equal to about thirty-nine hogsheads.

Carbon emitted from the lungs equal to more than 12 ounces of charcoal every 24 hours.

The quantity of carbon thrown out of the system of the lungs, when estimated in the gross, may afford matter of no less astonishment. For, taking the gravity of the carbonic acid gas as calculated by Lavoisier, a person in health must emit from his lungs something more than is equal to twelve ounces of solid carbon or charcoal, every twenty-four hours; or, according to another estimate, five thousand two hundred and eight grains.§

Primary cause of the red colour of the blood not yet settled.

The primary cause of the red colour of the blood is a chemical, rather than a physiological question: and belongs to the sanguiferous, rather than to the respiratory function; yet, upon this point, also, physiologists are by no means agreed, some

* Connexion of Life with Respiration, pp. 27. 37. † De Motu Animal. p. 126. ‡ De Respirat. p. 32. § See Bostock's Element. Syst. of Physiol. vol. ii. p. 111.

ascribing it to the conversion of the iron, which forms a constituent principle of the blood, into a red oxyde; and others, and particularly Sir Humphry Davy, to the affinity which the calorific rays of light have for oxygen generally, and hence for the oxygen of the animal system; against the surface of which it is perpetually impinging, and into which it is perpetually carried in combination with the inspired air; separating it incessantly from its union with the carbon of the animal frame, and transforming the carbon, thus decomposed and simplified, into a dark pigment. But there are difficulties that hang about both these, and, indeed, every other hypothesis that has yet been started, concerning even the primary cause of the red colour of the blood, as we shall have occasion to notice more at large hereafter.

Yet, whatever may be the primary cause of the red colour of the blood, we find that, in respiration, there is some other cause superadded, and which, as observed above, heightens the colour the blood possesses at the time of its reaching the lungs, and converts it from a deep purple, or modena, into a rich scarlet. This M. Lavoisier, as we have already hinted, supposed to be produced by that supply of oxygen which he conceived it was the express object of respiration to communicate to the blood: and, in support of this view, a variety of experiments were appealed to, which seemed to show, that the colour of the blood becomes brighter whenever exposed to the action of oxygen. Yet till all the objections of Mr. Ellis are satisfactorily removed, and those of Dr. Edwards are farther confirmed, that oxygen in a free state is actually introduced from the air-cells of the lungs into the adjoining minute blood-vessels, we can place little dependence upon this explanation, however plausible and inviting.

But, may not the deepened colour of the blood be produced by the carbon, with which it becomes gradually loaded in the course of its circulation, and which, by the consent of all parties, is separated from it in the process of respiration? and, consequently, may it not recover its brightness by the mere loss of this diuys pigment, whether oxygen enter at the same time into the blood-vessels or not? If the primary colouring material of the blood be the iron which it contains, as first suggested by MM. Parmentier and Deyeux, and the carbon be a recrementary and adventitious material, this reply might be satisfactory; but if, as supposed by Sir Humphry Davy, the carbon of the blood be itself the pigment that colours it from the first, the explanation will content but very few. Yet this last hypothesis is as open to attack as any of the rest; for, to say nothing of the difficulty of conceiving how the carbon of the animal fluids can give a deep dye to the blood, while it gives no dye whatever to any of the fluids besides, it is sufficient to observe, that an abstraction of a part of this dye may, indeed, form a lighter hue of the same kind, but not a different hue. The hypothesis has yet to account for that yellow or orange tint, which must be added to the red of the venous blood be-

III. Respiration.

Hypothesis of the French chemists. Hypothesis of Davy.

Difficulties in both these, as well as in every other conjecture.

In respiration some other cause superadded which changes the deep red of the veins into the scarlet of the arteries;

which has not yet been satisfactorily explained.

The deep red, whether produced by the carbon of the blood?

This may be true if the primary colouring matter be the iron of the blood.

But not so if the primary colouring matter be the carbon itself.

This conjecture also objectionable.

III. Respiration.

fore it can become changed into the red of the arterial ; for, as a simple dilution of venous blood will not furnish this tint, so neither will a simple abstraction of the only colouring material, which is hereby supposed.

Stagnant arterial blood acquires a purple colour.

[In the consideration of the cause of the loss of the bright scarlet colour, one fact, pointed out by Mr. Hunter, merits particular notice, viz. that blood, when it is rendered stagnant in an artery by the effect of a ligature or the tourniquet, or in the cellular membrane by extravasation, assumes the purple colour of venous blood.* But, as Dr. Bostock properly remarks, even if Hunter's experiments, and certain others undertaken by Hasenfratz, were to be received as proofs, that the change of blood from the arterial to the venous state may be effected independently of any addition from without, it does not necessarily follow, that the reverse operation can happen in the same manner ; nor, indeed, have we any evidence that it ever has been accomplished, without the intervention of oxygen.†]

Whether caloric be the cause of the change of colour :

It may perhaps be said, that though oxygen do not get admission, caloric does ; and this, too, very freely, and becomes itself the cause of this change of colour. And, in truth, this is the explanation offered by Mr. Ellis and various other physiologists ; who contend that the function of respiration consists, firstly, in freeing the blood from its load of carbon, and, secondly, in introducing a very large portion of the matter of heat in its stead ; thus far advocating the hypothesis of Dr. Crawford. And as a proof that caloric, as a substance, is separated from the inspired air, they appeal to the quantity of vapour that is formed in the vesicles of the lungs simultaneously with the formation of the carbonic acid, and which they ascribe to this cause ; regarding the lungs as the great laboratory, in which the matter of heat or caloric is accumulated, and rendered fit for the use of the system.

and the lungs a laboratory for the accumulation of heat.

Requires proof.

The last function has been allotted to other organs.

But this, again, is to take for granted what yet remains an unsettled question, namely, whether caloric be a substance or a mere quality of body. Independently of which, admitting the substantive existence of caloric, and that some organ or other is specially employed in its evolution and introduction in a free state into the system, it is by no means established that this organ is the lungs ; for Dr. Currie, in an ingenious paper, published some years ago, attempted to show, by various experiments, that this is chiefly effected by the action of the stomach, which was also the doctrine of Mr. Hunter. And Mr. Brodie has long since brought other experiments that seem to refer it to the action of the brain.‡ Perhaps, however, all these and various other organs may co-operate to the same effect.

Advantage immediately derived from the change of colour in the lungs not fully known.

Much still remains to be ascertained upon this interesting subject. Even the recovery of the bright hue itself to the blood, by whatever means accomplished, and which by most physiologists is regarded as a fact of the utmost importance in

* On the Blood, p. 65.

† Elem. Syst. of Physiol. vol. ii. p. 133.

‡ Phil. Trans. 1812, p. 378.

the process of respiration, is contemplated by Mr. John Hunter as of scarcely any importance whatever, except as a proof that the blood has undergone the action of ventilation; an action which he conceives, from its being as necessary to white-blooded animals as to red-blooded, produces a far greater effect on the coagulating lymph, than on the red particles.* And hence, though we have an abundance of facts and experiments upon the subject before us, and an abundance of speculation in respect to them, "the COMMERCIIUM MENTIS ET RERUM," as Lord Bacon has elegantly expressed it, has not hitherto led to any established doctrine, however creditable it has been to the industry and ingenuity of those who have engaged in it.

III. Respiration.

Hence no set of experiments has led to any established doctrine upon the subject.

CLASS II. PNEUMATICA.

ORDER I.—*Phonica*.

AFFECTING THE VOCAL AVENUES.

THE term PHONICA (ΦΩΝΙΚΑ) is sufficiently explained in the definition. The order of diseases, which it is intended to comprehend, are seldom dangerous or acutely painful; and are rather characterized by trenching upon the grace or utility of the voice, than undermining the general health. It embraces the following

GENERA.

| | |
|-----------------|-------------------------|
| I. CORYZA. | RUNNING AT THE NOSE. |
| II. POLYPUS. | POLYPUS. |
| III. RHONCHUS. | RATTLING AT THE THROAT. |
| IV. APHONIA. | SPEECHLESSNESS. |
| V. DYSPHONIA. | DISSONANT VOICE. |
| VI. PSELLISMUS. | DISSONANT SPEECH. |

GENUS I. CORYZA.—*RUNNING AT THE NOSE.*

Defluxion from the nostrils obstructing their channel.

In the commentary to the nosological text, I have ventured to point out what seems to be the real origin of the term coryza, concerning which the Greek lexicographers are at a loss; and have shown it to be a genuine and very extensive as well as very ancient Oriental term, common, under some modification or other, to the Hebrew, Arabic, Chaldee, and Syriac dialects, from one of which it was doubtless imported into the Greek tongue. By Hippocrates it was used in a very extensive sense,

GEN. I.
Origin of the generic term.

How used by Hippocrates:

* On Blood, pp. 204—206, &c.

GEN. I. so as to signify defluxion of any kind, whether from the head, by the later Greek physicians : nostrils, fauces, or chest. The later Greek physicians restrained coryza to a defluxion from the head and nostrils, and applied the term catastagnus to a defluxion from the fauces and thorax. by modern writers. Among modern writers, at least since the time of Cullen, coryza is used synonymously with catarrh, and is consequently regarded as a febrile affection. But this is rather to confound morbid affections, than to simplify them. Coryza, running, defluxion or distillation from the nose, may indeed occur as a symptom in catarrh, as it may also in various other complaints, as the measles and some species of ophthalmy ; but it may also occur, and as a simple and idiopathic affection does occur, without febrile action of any kind. In which cases, indeed, it is of little importance, and not often worthy of medical interposition : yet, in a general system of morbid affections, it ought no more to be passed by unnoticed, than a hedge or bog-plant in a system of botany.

Coryza. Simple defluxion from the nostrils may proceed from two very different states of body, or of local power in the organs affected ; which furnish us with two distinct species of affection, characterized by sufficiently marked and discrepant symptoms :

- | | |
|---------------------|-----------------|
| 1. CORYZA ENTONICA. | ENTONIC CORYZA. |
| 2. CORYZA ATONICA. | ATONIC CORYZA. |

SPECIES I. Coryza Entonica.—*Entonic Coryza.*

The defluxion pellucid, mucous, or ropy ; with a sense of irritation or infarction.

Secernent action increased : absorbent diminished. In this species, there will always be found an increased action of the secernent emunctories of the nostrils, while the absorbents remain little disturbed in their function ; and as a morbid diminution of active power is ordinarily expressed by the terms atony and atonic, so entony and entonic are in the present work employed to express the opposite, or a morbid excess of activity. According to the difference of the stimuli, or accidental causes by which the present affection is produced, there will be some difference in the symptoms : for these causes may be sternutatories ; the irritation of continuous sympathy, as in crying or weeping ; a damp chill, or some other change produced suddenly in the temperature, or perhaps temperament, of the atmosphere. And it is still more generally, and often with great abruptness, brought on by a transfer of action, or a sort of reverse sympathy with some remote organ. Thus, there are many persons, who, as Dr. Darwin observes,* by sleeping at night with their arms or shoulders accidentally uncovered, become cold and torpid in the cutaneous vessels of these organs, and have their nostrils instantly affected with increased action, filled with mucus, and so thickened in the mucous membrane as to render them almost incapable of breathing.

* Zoonom. Cl. I. Ord. I. ii. 7.

An ozæna or nasal ulcer will also frequently produce a like effect: in which case, the increased defluxion will be intermixed with a purulent or ichorous matter, sometimes throwing forth an offensive smell: all which may be arranged in a tabular form under the following varieties:

GEN. I.
SPEC. I.
Coryza entonica.

- | | |
|------------------------------|--|
| α Sternutatoria. | From sternutatories: accompanied with sneezing. |
| β Lachrymosa. Snivelling. | From weeping or crying: the lachrymal secretion being increased by mental emotion. |
| γ Catarrhalis. Snuffling. | From sudden chill or moisture in the temperature or temperament of the atmosphere. |
| δ Ozænosa. | The defluxion more or less purulent; or ichorous and fetid. |

The last is a case of surgical rather than of medical treatment, and is often connected with a caries of the ossa spongiosa, or ossa nasi, and frequently with a lodgment of pus in the frontal sinus or antrum maxillare; in both which cases, the inflammation is at times accompanied with excruciating pain. The first is peculiarly common to grazing animals, and especially to sheep, from the irritation of minute insects, and especially those of the gad-fly, whose eggs have been deposited in the upper part of the nostrils by the impregnated female.

General remarks respecting the cure. Progress and modifications.

From the dryness of the mucous membrane of the nostrils in India, the common coryza is peculiarly common under the name of *naukera*. The natives cure it in its onset by topical bleeding: for which purpose, they prick the inflamed membrane with a sharp-edged grass, which answers the purpose of a lancet, and soon relieves the pain by the flow of blood which ensues.*

A warm atmosphere easily, and in a short time takes off the variety produced by a sudden application of cold, or a sudden change in the temperament of the atmosphere, and which makes an approach towards a catarrh, though without any sense of heaviness or oppression in the head, or harshness in the fauces. From the obstruction of the nostrils, however, there is usually a nasal voice and a deficiency or loss of smell; and, where the discharge is acrid, an excoriation of the mucous or Schneiderian membrane. When it is the result of a reverse sympathy with the arms or other limbs, rendered chilly at night by being uncovered, it is easily and almost instantly removed by covering the chilly organs with additional bed-clothes, and thus restoring the balance of heat and cutaneous secretion.

Treatment.

In a singular idiosyncrasy, reported in the *Ephemera of Natural Curiosities*, the odour of roses, without amounting to a sternutatory, proved a stimulus sufficient to excite a coryza whenever applied.† It is well remarked by Galen, that various foods produce a like effect;‡ and Bonet, in one instance, found

Singularities of cause and effect.

* Miscellaneous Obs. on certain Indigenous Customs, &c. in India, by Daniel Johnson.

† Dec. ii. Ann. v. Obs. 22.

‡ Fragment. ex Aphor. Rabi Moyses, p. 36.

GEN. I. it occasioned by a globular tumour, surrounded by a fluid in the
 SPEC. II. ventricles of the brain,* probably from an excitement of the olfactory nerves, which take their rise in the corpora striata, situated in this quarter of the cerebrum.

SPECIES II. *Coryza Atonica*.—*Atonic Coryza*.

The defluxion limpid, and without acrimony or sense of irritation.

THE chief causes are exposure to a keen frosty air; the natural paresis of old age; and a long and immoderate use of strong aromatics, volatile alkali, or snuff; affording the three following varieties:

- α *Algida*. From exposure to a keen frosty air.
- β *Senilis*. From old age.
- γ *Superacta*. From habitual indulgence in snuff, or nasal stimulants.

Diminished
action in
both secer-
nents and
absorbents.

Treatment
of the first
variety,

as distin-
guished
from the
preceding
species.

In all these, there is diminished action in both the secerment and absorbent vessels of the nostrils, but chiefly in the latter, which almost uniformly yield soonest from causes we shall hereafter have to explain. And hence, while the secerments are only capable of separating a thin limpid water, instead of a viscid mucus, the absorbents are too inert to carry off even this; which in consequence accumulates, and drips from the nostrils. A warm atmosphere, or the vapour of warm water snuffed up the nostrils, affords an easy remedy for the first variety of this species, which far more frequently occurs, and perhaps only occurs, in a dry, sharp, frosty air, than in an atmosphere rendered chilly from damp; damp being, as already noticed, rather a cause of the preceding species. In the former case, the severity of the cold overcomes all power of re-action; and hence, notwithstanding there is a defluxion, because whatever is secreted is not carried off by the correspondent absorbents, the discharge is checked in its quantity, at the same time that it is rendered more limpid. In the latter case, the tone of the excretories rises superior to the chill, to which they are exposed, and the re-action ascends to something of a morbid excess. A warm room, and particularly the excitement of a gentle perspiration, will cure both; but the first is also often cured by brisk walking, or any other vigorous exercise proportioned to the sharpness of the frost: for, as the system becomes roused generally, the nasal excretories become roused also, and triumph over the cold with a re-active power, which is at the same time communicated to the correspondent absorbents, when the defluxion immediately ceases.

Two last
varieties
without
remedy.

The two last varieties are beyond the reach of medical aid. The coryza, or snuffling of old age, is precisely analogous to its pyalism or drivelling. In the one, the atony is seated in the excretories of the salivary glands; in the other, in those of the

* Sepulchr. Lib. I. sect. xvii. Obs. 10.

mucous membrane of the nostrils. Among the habitual irritants that lead to the same effect, snuffs are the worst: for the tobacco, of which they consist, operates with the mischief of a narcotic as well as of a stimulant; and hence the copious and foul secretion, with which the nostrils of aged snuff-takers are constantly deformed.

GEN. I.
SPEC. II.
Coryza
atonica.

GENUS II. POLYPUS.—POLYPUS.

Fleshy, elongated excrescence, generally shooting from a comparatively slender root attached to some part of the mucous membrane of the nostrils; extending in different directions, and affecting the speech.

This is the polypus properly so called, and the disease to which the term is applied by Celsus, and continued to be applied till after the days of Heister, who uses it in the same restricted sense. More lately, however, the term polypus has been employed in a much looser signification, and made to import concretions and excrescences appearing in various channels or cavities of the body, of very different origins and textures, as those of the heart; those of the uterus and bladder, which are caruncles or sarcophytes, with a slender base, or peduncle; and those of the trachea in croup, which are concrete gluten; whence the croup is by such writers denominated *angina polypus* or *polyposa*.

Generic term used in the present sense formerly: but indefinitely in later times.

It is better, with the old authors, who have been followed by Vogel, and still more lately by Mr. B. Bell, to restrain polypus as a distinct generic term to peduncular excrescences in the nostrils; and to distinguish by the phrase polypous tumours, caruncles, or shoots, such adscititious productions as may have a resemblance to them in other organs.

What ought to be the distinction.

[Most polypi are extremely vascular, and apt to bleed profusely, though differences in this respect are noticed. No age nor sex is exempt from the disease, which sometimes assumes a malignant character, and sometimes destroys the patient either by the repeated bleedings which it induces, the pain and constitutional disturbance which it keeps up, or by the effects of its pressure on the surrounding parts, and even on the brain itself.]

Polypus, in the above limited sense, comprises two species, from the very different texture under which it is found.

- | | |
|-----------------------|------------------------|
| 1. POLYPUS ELASTICUS. | COMPRESSIBLE POLYPUS. |
| 2. ——— CORIACEUS. | CARTILAGINOUS POLYPUS. |

SPECIES I. Polypus Elasticus.—Compressible Polypus.

Soft, compressible, unaching, chiefly pale-red; apparently originating from distention, or relaxation of the Schneiderian membrane.

This species is very apt to be affected by the state of the atmosphere; being often retracted and shrivelled in dry weather,

Affected by the atmosphere.

GEN. II.
SPEC. I.
Polypus
elasticus.
Little pain-
ful.

May be
easily re-
strained in
an incipient
state.

Afterwards
should be
extirpated.

and enormously enlarged and elongated in thick hazy weather. There is little pain during any stage of its progress, however troublesome it may be to deglutition or the voice. [As far as the experience of Professor Gibson goes, the most common variety of the compressible polypus is that which bears, in consistence, shape, colour, and size, a striking similitude to the common oyster.*] If attended to when small, or in an incipient state, it may often be prevented from growing large by the use of astringent applications; as a strong solution of alum, a decoction of oak-bark, or the application of vinegar or brandy. But where the excrescence becomes inconvenient from its bulk, it ought to be instantly extirpated. When timely attendance is not paid to it, and especially in unhealthy habits, it sometimes assumes a scirrhus character, and at length is apt to bleed with great freedom, sloughs, and ultimately produces, from its increased size and malignity, a horrible disfigurement of the face; and renders life most pitiably distressing. And where it does not become strictly cancerous, it degenerates into a fungous ulceration, nearly as much to be dreaded.†

[Experience proves, that extraction, with a suitable kind of forceps, is generally the best method of extirpating nasal polypi. In a very few instances, other plans may be allowable. Thus, in one case, under the care of Mr. Robertson, of Kelso, the size of the polypus rendered the introduction of a pair of forceps, or a ligature, impracticable. Hence, an incision was made through the nose on the affected side, and the mass of the polypus brought into view. Two ligatures were passed through it; but its magnitude was such, that its root could not be reached. By perseverance, however, so much of the tumour was cut away, with the aid of the ligature, that Mr. Robertson at length succeeded in detaching the root with the point of his finger.‡]

SPECIES II. Polypus Coriaceus.—*Cartilaginous Polypus.*

Firm, cartilaginous, often painful, chiefly deep-red; apparently originating from, or connected with, a caries of the Ethmoid Bone.

Painful
from an
early stage.

When ex-
tracted, apt
to regener-
ate.

Ought not
to be ex-
tracted
universally.

THIS species is not only painful, but, from being firm and deep-seated, very troublesome in removal. It is not always, indeed, that it can be extirpated entire, or that it is advisable to extirpate it when possible. When extracted imperfectly, it is very apt to regenerate, and has sometimes become cancerous.

It is too generally believed, however, that polypi in all instances may and ought to be extracted; and that, if the shoot can be laid hold of by the forceps, and we are not afraid of any hemorrhage, nothing is to be dreaded from the operation. Mr.

* Institutes and Practice of Surgery, vol. ii. p. 296. Philadelphia, 1825.

† Lectures of Sir Astley Cooper, Bart., with Additional Notes, &c. by F. Tyrrell, Esq. vol. i. p. 354, 355. 8vo. 1825.

‡ Edin. Med. Journ. No. 90, p. 44.

Pott was of a different opinion: he had observed many cases, which, though neither scirrhus nor cancerous, were very unfit for any surgical process. Some circumstances, he remarks, may forbid the attempt, from the impossibility of its being successful; others, from its being more likely to increase and exasperate the disease than to cure it. He dissuades from the operation in almost every instance of the second or coriaceous species; in all those cases, in which the polypus begins with considerable pain in the forehead and upper part of the nose, or is preceded by these symptoms; and which, as soon as it can be seen, is either highly red, or of a dark colour; which is never alternately smaller and larger, but rather progressively increasing: in which the common actions of coughing, sneezing, or blowing the nose, give pain, or produce a very disagreeable sensation in the nostril and forehead; in all cases of polypi, which, when within reach, are painful to the touch, or which, upon being touched slightly, are apt to bleed; those which do not seem to be moveable by the action of blowing the nose, or driving the air through the affected nostril only, when confined to one side; those which are incompressibly hard, and, when pressed, occasion pain in the corner of the eye, or in the forehead, and which, if they discharge any thing, shed blood; those which, by adhesion, occupy a very considerable space, and seem to consist of a thickening or an enlargement of the membrane covering the septum narium; those from which there is a discharge of an ulcerous, offensive, discoloured fluid; and those round the lower part of which, within the nose, a probe cannot easily and freely be passed to some height. In all cases thus characterized Mr. Pott was of opinion, that no trial should be made by the forceps; and he advised farther, that no attempt to remove them should be made by any other means, with which he had the good fortune to be acquainted.

But where these characters do not occur, and, in general, where the polypus answers to the first species in elasticity and colour, he recommends its removal, and by the forceps rather than by escharotics, ligature, or any other means; and thinks it may be extracted with great safety.*

GEN. II.
SPEC. II.
Polypus coriaceous.
Circumstances unfriendly to the operation according to Pott.

Circumstances favourable to a removal of the excrescence.

GENUS III. RHONCHUS.—RATTLING IN THE THROAT.

Harsh, sonorous breathing from stagnation of mucus in the Vocal Canal.

THERE are two species of morbid affection which may be arranged under this genus, each of which has been raised to the rank of a distinct genus by Vogel and several other nosologists; while by Cullen, and those who have followed him, they have been entirely struck out of the catalogue of morbid affections,

How far idiopathic,

* *Chirurgical Obs. relative to the Cataract, Polypus of the Nose, &c. 8vo. Lond. 1774.*

GEN. III. as either unworthy of notice, or merely symptomatic of some
Rhonchus. other complaint.

and entitled
to a distinct
notice.

To a generic distinction they are scarcely entitled; but a slight acquaintance with the habits and morbid actions of the system, is sufficient to afford instances in which both sorts are idiopathic. Many persons have a thick or wheezy respiration, produced by corpulency, or by changes of the atmosphere, from hot to cold, or from dry to moist, without any other disease. Many persons snore habitually during sleep; and most persons have a tendency to do so as they grow old. Under such circumstances, the affections before us are strictly idiopathic. They are not often indeed accompanied with much inconvenience; but, as deviations from a perfect state of health, they have a full claim to their respective places in a general system of nosology. Confervas in botany, and infusory worms in natural history, are as confessedly objects of scientific arrangement and study, as the oak and the elephant.

The two species then, appertaining to the present genus, are the following :

1. RHONCHUS STERTOR.

SNORING.

2. ————— CERCHNUS.

WHEEZING.

Subdivisions
of Laennec.

M. Laennec has increased the subdivisions of rhonchus or, as he calls it, *râle*, to five; and as modified by a variety of primary diseases of the chest, they may easily be extended to this number; but then they become mere symptoms, and not idiopathic affections. "For want," says he, "of a better, or more generic term, I use the word *râle*, *rattle*, or *rhonchus*, to express all the sounds, besides those of health, which the act of respiration occasions, by the passage of the air through fluids in the bronchiæ, or lungs, or by its transmission through any of the air-passages partially contracted." He distinguishes five principal kinds of rattle: 1. The moist crepitous. 2. The mucous, or gurgling. 3. The dry sonorous. 4. The dry sibilous, or hissing. 5. The dry crepitous, with large bubbles, or crackling.*

SPECIES I. Rhonchus Stertor.—*Snoring*.

The sound deep and loud; produced in the larynx and fauces.

General
remarks.

As a symptom, this is common to apoplexy; but, as I have just observed, it is found idiopathically in many instances, brought on by advancing age, or peculiar to the habit. A syrup, made of the leaves of the *erysimum officinale*, or hedge-mustard, was for this kind of noisy breathing once popular; and the pungency of the plant may often prove useful. The common cause is here, a lodgment of the tougher and denser part of the mucous secretion of the larynx and fauces in these passages.

* De l'Auscultation Médiate, ou Traité du Diagnostique des Maladies des Poumons et du Cœur, &c. par R. T. H. Laennec, &c. 2 tomes. Paris, 1819; and translation, with Notes, by Dr. Forbes, 2d edit. p. 49.

In some cases, as in the atonic coryza of age, the excretories of these organs may be permanently relaxed, so as to admit of a larger defluxion, than in health and vigour. And hence, local stimulants are particularly applicable; among the best of which may be ranked camphor, and other terebinthinate medicines, gum ammonia, and the alliacea.

GEN. III.

SPEC. I.

Rhonchus
stertor.

SPECIES II. Rhonchus Cerchnus.—*Wheezing.*

The sound dense and impeded; produced below the larynx.

THIS affection, as a symptom, is common to asthma and dyspnoea; but, as I have already observed, it is sometimes found as a primary evil, or independent of any other complaint. In the introductory dissertation to the present class, we remarked that a considerable quantity of aqueous vapour is formed in the air-cells of the lungs during the process of respiration; supposed, by the physiologists who contend for the inhalation of caloric as a distinct substance, to be produced by its separation from the inspired air of the atmosphere, and the union of a part of its oxygen with the hydrogen furnished by the lungs. In health, this vapour is very freely exhaled by the mouth, and forms that mist, which is seen to issue from every man's lips in frosty weather, and especially when thrown upon a dark polished surface, as that of a mirror. But, if the bronchial vessels be obstructed by a more than ordinary increase or accumulation of mucus, it escapes with difficulty; and, encountering the air that is thrown into the lungs, occasions that hissing, or wheezing sound, which is always produced by a current of air when it has to force its passage through a body of dense vapour. Commonly, therefore, this is a case of atony, local or general; and, like the last species, will be best relieved by those medicines that gently stimulate, and warm, and give power to the bronchial lymphatics, as the resinous gums, and the bulbs of the alliaceous plants. In fat people, and especially those who are low of stature, short-necked, and oppressed with fat about the chest, the obstruction is chiefly the result of infarction and pressure; for the diaphragm and other muscles, not having full play, the lungs are never thoroughly expanded, and the extricated vapour is put into a smaller space, and has a narrower exit. And here the only cure must consist in taking off the obesity by repeated venesections, active purgatives, vigorous exercise, and a low diet.

Pathology,

Ordinarily
a result of
atony, and
relieved by
tonics and
stimulants.
Sometimes
a result of
obesity;
and cured
by lowering
the system.

GENUS IV. APHONIA.—DUMBNESS. SPEECHLESSNESS.

Inability of speech.

WE now proceed to a group of diseases that affect not so much the trachea or general avenue of sound, as the organs of

General
remarks.

GEN. IV.
General
remarks.

articulation fixed on its upper end, like a capital upon a pillar, as M. Blumenbach has elegantly observed, and consequently which impede or vitiate the power of speech. These have been very differently arranged by different writers, and have often been very unnecessarily extended and complicated, especially by Vogel, as may be seen by a reference to the commentary in the author's volume on Nosology. Upon the whole, they will be found to distribute themselves most easily and distinctly under the three following generic divisions: defects that depend on an utter inability of speech; those in which the sound of the voice is imperfect or depraved; and those in which, while the sound of the voice continues unaffected, the articulation is incorrect or vitiated. It is the first of these divisions that constitutes the genus before us.

Inability of speech may proceed from three different causes, each of which lays a foundation for several symptoms peculiar to itself, and consequently for the three following species:

- | | |
|-----------------------|--------------------|
| 1. APHONIA ELINGUIUM. | ELINGUAL DUMBNESS. |
| 2. ——— ATONICA. | ATONIC DUMBNESS. |
| 3. ——— SURDORUM. | DEAF-DUMBNESS. |
-

SPECIES I. Aphonia Elinguium.—*Elingual Dumbness.*

Speechlessness from destitution of tongue.

THIS may be of two sorts; each of which lays a foundation for very different results:

- | | |
|--------------|--|
| α Congenita. | The defect coeval with the birth. |
| β Oblæsa. | The defect produced by accident, punishment, or disease. |

Power of
the glottis
compared
with that of
the tongue.

The glottis is the chief organ employed in dividing the voice into distinct or simple tones or notes; as the tongue chiefly divides it, either singly, or by a co-operation with other organs, into distinct articulations, so as to form proper language, which is hence commonly regarded as nothing more than a modification of the powers of the *lingua*, as the *tongue* is called in Latin; and hence *tongue* and *language* are often used synonymously. It is obvious therefore, that, in all common cases, the man who is deprived of his tongue, whether by congenital defect, by mechanical force, or by disease, must at the same time be deprived of the power of speech, and become dumb.

Hence
those with-
out a
tongue,
for the most
part dumb.

Yet not
always,
since the
glottis or
other organs
sometimes
supply its
place;

I say in all common cases; for a privation of the tongue is not always accompanied with dumbness. It is not necessarily so in all cases of congenital destitution, and still less in all cases of privation that occur after speech has been acquired. In the Physiological Proem to the present Class, we had occasion to remark, that the glottis alone, in some instances, either from a greater pliancy and volubility of the muscles proper to it, or from the possession of some superadded muscle or membrane, seems to have a power of forming distinct articulations without

the assistance of the tongue: and I hence endeavoured to account for that singular talent, which we denominate ventriloquism. But there is a more singular talent still, that sometimes occurs in the history of the human voice, and which is probably resolvable into the same cause; for we have examples, supported by indisputable authentication, of persons, who, having lost the entire organ of the tongue, and a few of them of the uvula also, have still retained a power of speaking, and even of expressing themselves with a clear and accurate enunciation. Such examples, indeed, are not very common; but they seem to have occurred in all ages, and especially when it was the barbarous custom among the Turks, Goths, and other half-civilized nations, to cut out the tongues of the unhappy wretches, whom the chance of war had thrown into their hands as prisoners.

GEN. IV.
SPEC. I.
Aphonia
elinguium.
as in ventri-
loquism,
and still
more so in
some per-
sons whose
tongue has
been ex-
tirpated.

Some persons profess to disbelieve all the stories of this kind, for the mere reason that they have never witnessed any thing of the same kind in their own age or country. But such persons would have also joined the king of Siam in disbelieving the Dutch ambassador's assertion, that the rivers in his own country became so hard and solid during the winter, that men and women could walk and skate upon them. The accounts are too numerous, and in many instances too well supported, to be treated with scepticism; and all that is left to our judgment and ingenuity is not to deny the evidence, but to account, as we shall presently proceed to do, for the fact.

Such ac-
counts un-
justly dis-
credited,

when well
supported
by evidence.

Hundreds of cases might be quoted upon this subject; but the following may be sufficient, though others are referred to in the nosological system, which may be examined at the reader's leisure. Those now selected are taken from recent times, and from authorities that may indeed be disbelieved, but cannot be disputed.

Illustrated
from recent
examples.

In the third volume of the *Ephemerides Germanicæ*, we have the history of a boy, who, at eight years of age, lost the whole organ of the tongue, in consequence of a splanchnitis proceeding from the small-pox, and who was able to talk after its separation. The boy was exhibited publicly, but a trick was generally suspected; in consequence of which the boy and his friends were summoned to appear in court before the members of the celebrated university of Saumur. In the presence of this learned body, he underwent a strict examination as to the loss he had sustained, and the lingual powers he still possessed. The report was found correct; and the university, in consequence, gave their official attestation to the fact, in order, as it expressly asserts in its records, that its reality might not be called in question in succeeding times.

Case exam-
ined by the
university of
Saumur.

In the *Mémoires de l'Académie des Sciences* for the year 1718, is an account of a girl, who was born without a tongue, but had nevertheless learned to speak, and talked as easily and distinctly as if she had enjoyed the full benefit of that organ. The case is given by a physician of character, who had accurately and repeatedly examined the girl's organs of speech, and was desirous that others should examine them also.

Case of
congenital
destitution
of tongue
recorded by
the Acadé-
mie des
Sciences.

GEN. IV.
SPEC. I.

Aphonia
eliugium.

Case fur-
nished by
our own
country.

Tongue lost
at four years
old, together
with uvula:
articulation
retained
perfectly; as
also a power
of singing.

Parochial
attestation.

Royal So-
ciety eye-
witnesses.

Articula-
tion, by
what means
accom-
plished.

Enumera-
tion of ar-
tificate
organs.

Their rela-
tive powers.

Tongue
submits to
violence
with less
mischief
than most
organs.

About seventy years ago our own country furnished us with another equally striking example of the same power, and which forms the subject of various papers in the Philosophical Transactions, drawn up chiefly by Dr. Parsons at the time, and printed in the volumes that were published between the years 1742 and 1747. It is the history of a young woman of the name of Margaret Cutting, of Wickham-market, near Ipswich, in Suffolk; who, when only four years old, lost the whole of her tongue, together with the uvula, from what is said to have been a cancerous affection; but still retained the powers of speech, taste, and deglutition, without any imperfection whatever: articulating, indeed, as fluently and with as much correctness as other persons; and articulating, too, those peculiar syllables which ordinarily require the express aid of the tip of the tongue for exact enunciation. She also sung to admiration, and still articulated her words while singing; and could form no conception of the use of a tongue in other people. Neither were her teeth in any respect able to supply the place of the deficient organs; for these also were but few, and rose scarcely higher than the surface of the gums, in consequence of the injury to the sockets from the disease that had destroyed the tongue. The case, thus introduced before the Royal Society, was attested by the minister of the parish, a medical practitioner of repute, and another respectable person. From its singularity, however, the Society evinced a commendable tardiness of belief. They requested another report upon the subject, and from another set of witnesses, whom they themselves named for the purpose, and for whose guidance they drew up a line of categorical examination. This second report soon reached the Society, and minutely coincided with the first: and, to set the question completely at rest, the young woman was shortly afterwards brought to London, and satisfied the Royal Society in her own person.

To explain this unexpected power, we should not only turn our attention to what is actually and in our own day accomplished by ventriloquists; but should recollect, that the tongue is only a single organ employed in the articulation of sounds, and that the fauces, nostrils, lips, and teeth, bear, at least, an equal part, while the glottis, which forms all the vocal or vowel sounds, is the chief organ of the whole. In reality, out of the twenty-four articulate sounds which fill up our common alphabet, the only two, in which the tongue takes a distinct lead, are the *l* and *r*, though it is auxiliary to several others; but the guttural, or palatine, as *g*, *h*, *k*, *q*; the nasal, as *m* and *n*; the labial, as *b*, *p*, *f*, *v*, *w*; most of the dental, as *c*, *d*, *z*, together with all the vowels, which hold so large a space in our vocabularies, are but little indebted to its assistance.

It is singular that so delicately sensible an organ as the tongue should receive the severest injuries, and submit to very violent operations, with less serious mischief, than almost any other organ of the same size in the body. And it is on this account that the cruel and barbarous manner, in which the tongue was extirpated by the ferocious tribes that overran Europe from the East

formerly, was rarely productive of fatal consequences. Sir Everard Home published, many years ago, a paper upon this subject, containing various cases of sections of the tongue to a less or greater depth in consequence of diseased action. The operation was, in every instance, performed by the ligature. He does not state what effect was in any instance produced on the speech, and we are hence led to conjecture, that nothing in this respect occurred of material importance: but he draws the following conclusions: The internal structure of the tongue is less irritable, than almost any other organized part of the body. Its nerves appear to be more easily compressed and deprived of their power of communicating sensation, than nerves in general; and any injury done to them is not productive of diseased action in the trunk of the injured nerve. The tongue also has the power of throwing off its sloughs in a shorter time than any other part.

GEN. IV.
SPEC. I.
Aphonia
elinguim.
Illustrated
by opera-
tions of Sir
E. Home.

Conclusions
hence de-
rived.

SPECIES II. Aphonia Atonica.—*Atonic Dumbness.*

Speechlessness from atony of the vocal organs.

THIS atony is chiefly, if not altogether, confined to the nerves of the vocal organs, which may be injured by violence, or exhausted by mental or other commotion, independently of the occurrence of the disease occasionally as a symptom of paralysis, quinsy, or catarrh: thus furnishing us with two distinct varieties:

Chiefly con-
fined to the
vocal
nerves.

- | | |
|-----------|--|
| α Oblæsa. | From lesion of the nerves of the tongue or glottis. |
| β Soluta. | From sudden or overwhelming commotion, or shock of any kind. |

The instances of speechlessness, produced by an injury of the lingual nerves, are not common. But a division of the recurrent nerves, which are offsets from the par vagum, and distributed over the larynx and glottis, produces a speechlessness that is rarely, if ever, recovered from: for here the muscles belonging to the arytenoid cartilages, being rendered atonic or paralytic, can never be brought duly to contract again, the glottis remains permanently open, and the diameter of the larynx suffers no variety of contraction or dilatation. Galen seems to be the first anatomist who noticed this effect, or rather ascribed it to its real cause; for it was known before his time, that, by making ligatures on the blood-vessels of the trachea, the noisiest animal is immediately struck dumb, and made quiescent. It was supposed, that the state of the blood-vessels themselves, and not of the nerves included with them in the ligature, was the cause of this effect; that the blood became intercepted in its passage from the heart, and that the animal became mute because rendered comatose: and hence the name of carotids, or soporific vessels (from *καρος*, *sopor*), was given to the arteries, whose ligature was supposed to produce this very singular result

Dumbness
from injury
to the vocal
nerves.
When from
a division of
the recur-
rent nerves,
mostly
incurable.
First notice-
d by Galen
and ascribed
to its
real cause.
How ac-
counted for
antecedent-
ly.

Origin of
the term
carotids.

GEN. IV.
SPEC. II.

α A. atonica
oblaesa.

Proofs offer-
ed by Ga-
len.

Galen, however, demonstrated very satisfactorily, that the dumbness is, in this case, entirely owing to the pressure of the ligature on the accompanying nerves: and he afterwards produced to his opponents two cases of boys, who in a greater or less degree had lost their voice in consequence of the recurrent nerves being cut by surgeons unacquainted with anatomy, in extracting strumous tumours from the neck. In the one case, only one of these nerves was divided, and the voice was merely much weakened, or about half destroyed; in the other, both were divided, and the voice was lost altogether. A whizzing senseless noise, indeed, remains in most instances, as Vezalius has correctly observed; but there is no vocal sound, articulate or inarticulate.

Where the speechlessness has followed upon an injury of some branches of the lingual nerves, we have numerous examples of recovery. In one instance, the dumbness ceased suddenly after the patient had been speechless for not less than ten years.*

β A. atonica
soluta.

In other instances, dumbness is produced suddenly, from a total exhaustion of nervous power in the vocal organs, without any organic lesion whatever. A sudden and overwhelming emotion of the mind from terror, anger, or any other passion, has frequently had this effect in irritable habits. So has a violent fit of hysterics; or any other vehement shock, which† instantaneously deprives the nerves of their sensorial power, and the muscular fibres of their irritability: as a stroke of lightning, or a severe and unexpected blow on the stomach, will sometimes exhaust the vital energy of the entire system, and make life immediately cease. A sudden chill, as from drinking cold water during a violent heat, or the shock of a sudden fall, has frequently produced it, of which numerous instances are recorded in the Ephemerides of Natural Curiosities. Speechlessness of this kind has sometimes arisen from deleterious exhalations; from eating mushrooms; and in one instance, recorded in Hufeland's Annals, by repeatedly rubbing the wound made by a poisonous insect with saliva, and as often putting the finger to the mouth to obtain a supply of fresh fluid.‡ In like manner, Bonet informs us, that the same effect has followed from putting into the mouth a piece of money, cankered with the rust of verdigris.§

Singular
origins.

Curative
process.

Where medical aid is required, our dependence must be on tonics, local or general, and topical stimulants. Blisters and masticatories have chiefly been made use of, and frequently with good effect; as has the vellication of a hair-brush contrived for the purpose. The dumbness has sometimes yielded to emetics, at others to electricity;|| and, in a few cases, to a severe cough;¶ and occasionally the same, or a like violence

Treatment.
Sometimes
removed by
the same
violence
that pro-
duced it.

* Sammlung, 1721. ii. 406. 503. Bresl. † Büchner, Miscell. 1729. Bartholin. Act. Hafn. i. Obs. 101. Schurig, Chilologia, p. 205. ‡ See also Dupau, in Journ. de Medecine, Sept. 1789. § Bonet, Sepulchr. Lib. I. § 22. || Krazenstein, Pr. Hist. resitutæ Loquelæ par Electrizationem. Hafn. 1753. ¶ Iperen. Abh. aus holl. Schriften. b. i. p. 356. Morgagni, De Sed. et Caus. Morb. Ep. lxiii. Art. 15.

which occasioned the disease, has removed it, and the cause has become the cure; as is reported of Athys, the son of Cræsus. In like manner, we have examples of its having yielded abruptly to a fit of anger, or terror; in one instance, to a fit of laughter;* in another, to a blow on the head.†

GEN. IV.
SPEC. II.
Aphonia
atonica.

SPECIES III. Aphonia Surdorum.—*Deaf-Dumbness.*

Speechlessness from deafness, congenital or produced during infancy.

THE ears are as necessary to speech, or articulate sounds, as the tongue, or even the glottis; for if such sounds be not heard, and distinctly discriminated, they can never be imitated. Persons who become deaf after a thorough acquisition of speech, do not become dumb, for the very reason that articulation has already formed a habit, and can easily be preserved by practice. But if deafness be congenital, or take place antecedently to such habit, articulation can never be acquired afterwards, unless, by some rare good fortune, the ears should acquire hearing; and the unfortunate individual can only receive and interchange ideas by the eye; through which medium, however, he may be taught written, though not oral language; and thus still, happily for himself, have his mind almost as richly stored, though not his ideas as readily communicated, as through the outlet of speech. Persons thus organically defective, are denominated *sourds-muets*, or *sordi muti*, on the continent, and sometimes deaf-dumb among ourselves.

The ears as necessary to speech as the vocal organs. Why the deaf are not always dumb. Necessarily dumb where the deafness is congenital. Such may receive a communication of ideas by the eye, and acquire a knowledge of language.

[In eastern courts, it has been usual from time immemorial to retain a number of mutes. These are not only employed to amuse the monarch, but also to instruct his pages in an art, to us little known, of communicating every thing by signs, lest the sound of their voices should disturb the sovereign. The mutes are also the secret instruments of his private vengeance.‡]

This is an interesting subject, and not unconnected with pathological science, since it opens to us the only remedy that can be resorted to where the defect before us, or that of deafness prior to articulation, is the subject of discussion. It is interesting also to us from the very considerable proportion of human beings which in all countries, and apparently, in all ages, have been sufferers from this melancholy affection; a proportion that has been ingeniously calculated from a comparison of various tables, deduced from the extent of the disease in different parts of the world, as amounting to 1 in 2441 individuals.§ [In Germany, it is estimated, that, in every million of people, one hundred are deaf and dumb; and in the Danish dominions, the deaf and dumb amounted to 515 in the different bishopricks whose population was only 820,621, according to returns, made at the first anniversary of the Copenhagen Institution for this class of

Proportion of deaf-dumb to others.

* Iperen, ut supra. † Ephem. Nat. Cur. Dec. 111. An. v. Obs. 236.

‡ See Edinb. M. Journ. vol. vii. p. 61. § Quarterly Journal of Foreign Med. vol. i. p. 319.

GEN. IV.
SPEC. III.

Aphonia
surdorum.
Often fol-
lows in suc-
cession in
the same
family, when
once intro-
duced.

Instanced in
Ireland.

Not always
propagated
to a succeed-
ing genera-
tion.

General
principle
adverted to
in instruct-
ing the
deaf-dumb.

afflicted persons. In Bornholm, the proportion was still greater.*] And it is peculiarly lamentable to observe, that, when the defect has once made an entrance into a family, whether from the influence it produces on the nervous system of the mother, or from any other less obvious cause, it is peculiarly apt to become common to those children which are born afterwards; insomuch that we often meet with a third, or a half, and, in a few instances, where the first-born has been thus affected, with every individual of the progeny, suffering from the same distressing evil. "The late investigation in Ireland discovered families, in which there were two, three, four, or more thus circumstanced. In one family, there were five children all deaf and dumb; in another, seven, in another ten; and in that of a poor militia officer on half-pay, there were nine born deaf and dumb in succession."† Yet it is consoling to reflect, that the defect is not always propagated to a succeeding generation, when the deaf-dumb have married, and even when both the husband and wife have been thus afflicted. [Yet, it is said, that such propagation is not uncommon,‡ and as deafness is, without doubt, often hereditary, the experiment of marriage should be carefully avoided.]

To pursue the calamity, however, into the various plans which the benevolence and ingenuity of the human mind have invented to supply the defect of speech, from the times of [Juan Pabbo Bonnet, § of Madrid,] Ammanus of Amsterdam, and Wallis of our own country, to the wonderful degree of perfection attained under the Abbé Sicard, in the Royal Institution at Paris, would carry us far beyond the limits to which the present work must be confined. And I shall therefore only observe, that the grand principle laid down under almost all the various plans and systems that have been devised, in order to obtain the proposed remedy, and supply the want of speech, is that of commencing with picture-characters, and making these the key to alphabetical and arbitrary signs: and, in this manner, it is that the eye is rendered subservient to the purposes of the ear. When the deaf-dumb scholar is made to understand, that the picture of a knife or of a ship is to be regarded as the representative of such objects or ideas, there is no great difficulty in teaching him, that the arbitrary letters of which these words are composed, and which for this purpose are always written or should be written underneath these pictures, are intended to stand for the same purpose as the pictures themselves, and to import the same objects or their ideas, whenever they are met with in a certain arrangement: and so of other pictures and other combinations of letters which are equivalent to them. And hence, such combinations of letters, when the learners are accustomed to them, will as effectually become the signs or representatives

* Allgemeine Literatur, Zeitung. June 1807. † Quarterly Journal of Foreign Med. vol. i. p. 321. ‡ Edinb. Med. Journ. vol. vii. p. 62.

§ Reducion de las letras y arte para enseñar a ablas los Mutos. En Madrid; 1620. 4to. The earliest known work on the subject of instructing the deaf and dumb. Ed.

of the objects they are intended to express, as the pictures which preceded their use. The power that appertains to each separate letter is a lesson to be learnt long afterwards; and still longer afterwards an idea, for it can never be any thing more, of the vocal or articulate effects produced by different movements of the lips, cheeks, and throat, which that letter is designed to express.* An accurate and habitual attention, however, will teach the scholar this; and he will, in a considerable degree, be able to make out what is spoken by the motion of the lips and other vocal organs alone; and if he possess a facility of copying these, he may be taught, still farther, how to measure and modulate them, so as to produce the articulations they are intended to convey, and to speak with tolerable accuracy without hearing himself: while a fellow-scholar labouring under the same defect, and having made an equal progress in the same kind of education, will understand his meaning, or the vocal terms he conveys, by the mere movement of the vocal organs alone. I have myself borne a part in such conversations at that excellent institution of this metropolis, the Asylum for Deaf and Dumb Children, and have seen scholars conversing in this manner without hearing a single syllable on either side, but at the same time with a perfect understanding of each other's meaning.

Mr. Waller relates a singular case of this kind, in a man and his sister, who lived together to an advanced age, neither of them having the least sense of hearing, but who understood each other as well as other persons by the motion of the lips alone; supporting themselves by daily labour. They became deaf, however, when children, after they had learned to speak; and hence, in moving their lips, they continued to articulate, though not very distinctly.†

[A curious account is given by Bishop Burnet of a girl at Geneva, who could hold a conversation in the dark by laying her hand upon her companion's lips. The possibility of such a circumstance, it is said, has not been confirmed by subsequent experience. The mode, adopted for conversing in the dark, is by writing the word intended to be communicated upon the palm of the hand, or the back of the neck, thus addressing the sense of touch, which, as well as that of sight, is rendered by attention and exercise wonderfully acute.‡]

I have said, that the mode of commencing instruction in *almost* all the schools of the kind before us, is by pictures or other imitative signs, and that a knowledge of alphabetical characters does not take place till long afterwards. The limitation is introduced because in a few of the French schools in the present day, and particularly that at Bourdeaux, under the superintendence of the Abbé Gondelin and M. Gard, this easy and natural

GEN. IV.
SPEC. III.

Aphonia
surdorum.
Speaking by
the deaf-
dumb
learned long
afterwards:
how ac-
quired.

How con-
versation
can be
maintained
between
deaf-dumb
persons.

Singular
case of
habitual
conversa-
tion be-
tween per-
sons totally
deaf.

Conversa-
tion, how
maintained
in the dark.

French
schools.

* See the Abbé de l'Épée's *Institution des Sourds et Muets par le voie des signes méthodiques*, &c. Paris, 1776.

As also the Abbé Sicard's "*Théorie des Signes, ou Introduction à l'étude des langues; où le sens des mots, au lieu d'être défini, est mis en action*," tom. ii. 8vo. 1803.

† Phil. Trans. vol. xxv. 1797, No. 312, p. 2468.

‡ See Edin. Med. Journ. vol. vii. p. 62.

GEN. IV.
SPEC. III.
Aphonia
surdorum.

order is reversed, and the tutors have voluntarily loaded themselves with a very unnecessary difficulty, and their scholars with a useless and incomprehensible burden of many months' duration. For what reason the disciples of the Abbé Sicard, or of the Abbé de l'Epée, should thus intricately deviate from the plain and simple path of their masters, it is not easy to conceive.

Extent of
knowledge
and genius
often
evinced.
Illustrated
in M. Gard.

The extent of knowledge, and even the expansion of genius, which the deaf-dumb have occasionally exhibited, are truly marvellous; of which, indeed, M. Gard himself, to whom we have just referred, is a striking example. This gentleman was born with the faculty of hearing, and only lost it in his seventh year of childhood: so that his mind must have become stored with a multitude of ideas, derived from the inlet of hearing, which he could not have acquired afterwards. It is said that, in consequence of his deafness, he so completely lost the power of speech, as to forget even the commonest words that had been familiar to him. This feature, however, in his history seems to be considerably overcoloured; yet, it is well known, that he did not commence any plan of education till he was twenty-seven years old: from which time, such was the vigour of his mind, and the assiduity of his pursuit, that the able and professional critic, to whom I have just referred, affirms, "he is perfectly well informed upon all subjects which are usually studied; well versed in history, literature, politics, and languages. He has been taught Greek and Latin; and has, by himself, acquired the English language, of which he even showed us a grammar written for his own use. On presenting him with a printed report of one of our institutions, he immediately translated a part of it into French."*

Other ex-
amples.

Yet it is well known, that there are several other scholars of the same school that have excelled even M. Gard; and who, having been born perfectly deaf, have been necessarily dumb from the same period; of whom it may be sufficient to mention M. Clerc and M. Massieu. The last was literally taken from the plough, in the department of the Gironde, and was carried by a stranger, who happened accidentally to see him, and took compassion on him, to M. Sicard, at that time stationed at Bourdeaux. By dint of hard study, and a comprehensive capacity, he has also raised himself to the office of assistant instructor to M. Sicard, in the Parisian school, where he teaches the departments of syntax, history, geography, and *religion*. On one occasion, happening to be robbed, he pleaded his own cause in the court of justice: and when, during the French revolution, his revered master was put into prison, he addressed a letter of so much force and feeling to the President of the National Assembly, as to obtain his liberation.

Examples
of acqui-
sition of
speech on

There are a few instances on record of a recovery from deafness many years after birth, and of a gradual acquisition of speech in consequence hereof; chiefly produced by some vio-

* Quart. Journ. of Foreign Med. vol. i. p. 322. 1819.

lent but fortunate affection of the brain. Thus Lambzweerde relates the case of a fortunate fracture of the skull, through a fall from a considerable height, by which a young person, deaf-dumb from birth, was suddenly endowed with hearing, and, in process of time, with speech.* In like manner, Mr. Martin gives an account of a native of Stratherig, near Inverness, of the name of Fraser, who was born deaf, and continued dumb till seventeen years of age, when he was attacked with a fever which affected his brain for some time; on recovering from this, he began to have a sense of hearing, and soon afterwards to understand speech, which he gradually imitated, and at length acquired, so as to converse fluently; though, from commencing at so late a period, he never attained perfect accuracy in articulating many words.†

[Professor Rosenmüller has dissected most carefully the organs of hearing and of speech in persons born deaf, but could discover nothing peculiar in them.

As a means of cure, various plans have been attempted. Rosenmüller tried galvanism without success, and it has been tried by others quite ineffectually. One child suffered acute pain during the application of the pile, and seemed to be benefited for a month, but afterwards relapsed into its former condition.]

Puncturing the tympanum has been recommended by M. Delear;‡ and in a few instances with ourselves, as well as abroad, it has succeeded. It is hence worth trying, though the success has been very rare.

[In 1825, the particulars of a deaf-dumb boy, to whom the faculty of hearing was first communicated, when he was nine years old, were read to the Royal Academy of Sciences at Paris. The treatment, from which this success was derived, consisted in injecting air and fluids into the tympanum through the Eustachian tube; a practice very commonly adopted by Dr. Itard. The boy, named Claude-Honoré Trézel, had a physiognomy of little expression; the emblem of his understanding. He slodged and reeled about as he walked; could not even blow his nose; and made his principal wants known by signs. The first few days, immediately following the first establishment of his hearing, were a period of ravishment to him. All kinds of noises gave him excessive pleasure; and, while listening to a musical snuff-box, he seemed in a sort of ecstasy. But it was some time before he could comprehend, that speech was a means of social communication. Hence, at first he did not attend to the sounds by which it was formed, but only to the movements of the lips. For this reason, he fancied that a child, seven years old, spoke exactly like grown up persons. At length, however, he was taught, that the sounds were of more importance, than the motions specified. In this stage of improvement, he unluckily happened to hear a magpie utter some phrases, and, generalising from this particular fact, he inferred,

GEN. IV.
SPEC. III.
Aphonia
surdorum.
recovery
from congenital
deafness.

Complete
congenital
deafness
and dumb-
ness first re-
moved at
the age of
seven years.

* Append. ad Amœnit.

† Phil. Trans. vol. xxv. No. 312. p. 2469.

‡ Journ. Complémentaire, Juin, 1822.

GEN. IV. that all animals were gifted with speech, and he actually beat a
SPEC. III. favourite dog to make it pronounce "*papa*," "*du pain*," the
Aphonia only words he could himself speak.
surdorum.

These first advances in hearing produced a considerable alteration in the boy's physical state. His gait became firmer; his dull countenance assumed a smiling gay air; and he learned to blow his nose. A month passed away without much farther improvement; and it was a quarter of a year before the lad could understand a few compound words, and the meaning of some plain short phrases. It was a good while also before he could ascertain the direction of sound. Hence, when a person concealed himself in his room, and called him, he had the utmost difficulty in finding out the place in which the speaker was hidden, and then traced it rather with his eyes and reason than his ears.

The earliest sounds, which he acquired the power of forming, were low and grave; and the first words, which he learned to speak, were, "*papa, tabac, du feu*," &c. But, when he wished to pronounce more complex words, he exhibited various contortions of his lips, tongue, and all the agents of pronunciation, the uses of which he was completely ignorant of; resembling in this respect a beginner in dancing or swimming, who exhausts himself by useless ungraceful efforts. At last he succeeded in pronouncing a few compound words, which had previously baffled him. His progress continued, however, to be very slow; and he either skipped over many syllables, or pronounced them imperfectly. Perhaps, indeed, he would never have overcome this difficulty, had not the plan of instructing him through the sense of vision, instead of through that of hearing alone, been put in practice. Various syllables were now written down and pointed out to him; and, from this period, his pronunciation improved fast, as he comprehended with greater clearness the assemblage of vowels and consonants, and their reciprocal influence. Here, as M. Magendie observes, we see a very remarkable fact; namely, that the association of vision with the motions of the larynx was prompt and easy, while that of hearing with the organ of voice was always difficult, and but slowly acquired. Thus, when the boy looked at the written syllables, and they were pronounced near him, he could pronounce them himself; but, if the writing were removed, the clearest pronunciation of certain syllables close to him, did not enable him to articulate them himself.

By dint of the foregoing method, the boy learned to read and write tolerably fast; but, like persons who study a foreign language, and who generally learn to read and write it long before they can speak it, he still reads with his eyes, and writes infinitely better than he speaks. One curious circumstance is particularly recorded: whenever a word is distinctly pronounced to him, he immediately repeats it. For instance, when he is called, he never fails to repeat his name. When his preceptor tries to make him understand things, it is by gestures and looks; the means by which the boy himself most readily expresses his own ideas.

The improvement of his condition is wonderful : a year previous to the date of this history, he was so deaf that he was insensible of the loudest explosions : he now hears all noises very well ; knows whether they come from a distance ; can distinguish their nature ; gets out of the way of carriages and horses ; and runs to open the door when it is knocked. He relishes music ; and understands and repeats by memory certain phrases within his compass ; and gives answers to them. He is also able to do what his tutor directs him to do by words, though he cannot yet do this with other persons.

Finally, as M. Magendie observes, when it is reflected how much the boy must have learned to attain his present improved state ; what new ideas and combinations must have taken place in his mind ; what instinctive associations must have been formed between his ear and understanding, between this and his organ of voice, and his ear and his larynx ; there is every reason to hope, that his moral and physical state will yet continue to receive farther melioration.*]

GEN. IV.
SPEC. III.
Aphonia
surdorum.

GENUS V. DYSPHONIA.—*DISSONANT VOICE.*

The sound of the voice imperfect, or depraved.

VOICE, as we have already observed, is the sound of the air propelled through, and striking against the sides of the glottis : while speech is the modification of the voice into distinct articulations, by means of particular muscles in the cavity of the glottis itself, or in that of the mouth or the nostrils, employed as signs of ideas. Hence voice belongs to many animals in common with man : speech, thus limited as to its object, belongs to man alone ; for, no other animal can distinctly articulate, and make use of articulations, as signs of what is occurring in the mind : though a few animals may be taught to imitate articulate sounds without having ideas attached to them. The present genus embraces the morbid affections to which the voice is subject ; the next, those which appertain to the speech. It includes three species :

Voice contradistinguished from speech.

Hence voice common to many animals that are destitute of speech.

- | | |
|-------------------------|-------------------|
| 1. DYSPHONIA SUSURRANS. | WHISPERING VOICE. |
| 2. ————— PUBERUM. | VOICE OF PUBERTY. |
| 3. ————— IMMODULATA. | IMMELODIUS VOICE. |

SPECIES 1. Dysphonia Susurrans.—*Whispering Voice.*

Voice weak, whispering, and scarcely audible.

MANY of the causes of atonic dumbness, when operating with a less degree of violence, become causes of the present affection, while a few are peculiar to itself. The following varieties may not unfrequently be noticed :

* See Journ. de Physiol. Expér. tom. v. p. 223, &c.

GEN. V. α Oblæsa.
SPEC. I.

β Pathematica.

γ Compressorica.

δ Catarrhalis.

ε Enervis.

From lesion of the nerves of the larynx.

From sudden emotion of the mind.

From permanent compression of the trachea.

From neglected catarrh.

From simple debility of the larynx, without any obvious cause.

Independently of which the present species is occasionally met with as a symptom in melancholic, paralytic, and hysteric affections, as also in quinsy, dysphagy, and catarrh.

α D. susur-
rans oblæsa.

The nerves which, when injured, chiefly produce whispering are the recurrent. When these are divided, dumbness, as

Causes.

we have already observed, is the result; but they are often weakened and perhaps otherwise injured without being divided: and, in this case, the voice is not actually lost, but dwindles to a whisper; and is recovered as soon as the nerves resume their tone. The voice has, in this manner, frequently been injured by straining the ligaments and the minute muscles which move the parts of the glottis on each other; and in elevating the voice to a high pitch in public addresses, or striving at a note in singing which the natural compass of the voice will not reach. So Pliny tells us, that the voice of Gracchus, during a violent exertion in speaking, suddenly sunk to a feminine treble. Astringent gargles, blistering the throat, cold local bathing, external and internal, with perfect quiet and silence, are the best means of recovering the voice under such circumstances. The last I have found most serviceable; and have made the patient gargle four or five times a day with ice-water; which, at the same time, should be applied to the throat with a wet napkin.

Treatment.

β D. susur-
rans pathematica.

A sudden and overwhelming emotion of the mind from various causes, will sometimes totally choke or stifle the voice, which is particularly the case with rage: but, where the effect is not so violent, the voice becomes an almost inaudible whisper; and particularly when the passion is fright or terror. Rest and the return of confidence will usually restore it in a short time; but, in some instances, the effect has been permanent.

γ D. susur-
rans compressorica.

There are various cases in Morgagni and Bonet, in which the voice was rendered almost inaudible from the pressure of an enlarged heart, a bronchocele, or an aneurism of the aorta against the vocal avenues. Sauvages has referred to these; and it is highly probable, that such a pressure, by diminishing the capacity of the trachea, may lower the power of the voice.

δ D. susur-
rans catarrhalis.

A catarrhal whisper is a frequent occurrence, and there can be few practitioners who have not met with examples of it. The voice is often injured from the commencement of the catarrh, as well as in consequence of the inflammatory affection of the mucous membrane of the glottis, as of the increased secretion of mucus that issues from the interior of a great part of the trachea: and in some cases, in which the inflammation

had become chronic, by pulling forward the tongue I have seen the epiglottis covered with a cream-coloured coating, which was probably extended lower, and was a chief source of the difficulty of utterance. But the variety before us is the result of that weakness, which inflammatory action induces in the vocal organs, as a sequel, rather than a symptom, of the inflammatory action itself.

GEN. V.
SPEC. I.
J D. susur-
rans catar-
rhalis.

Mr. Archdeacon Squire relates a singular case of this kind in an attorney at Devizes, of the name of Axford, who, at twenty-eight years of age having caught cold, was seized with a hoarseness that in six days rendered him totally speechless; in which state he continued after the cold left him: being totally incapable of distinct articulation, and scarcely able to make the least inarticulate sound. Four years afterwards he got so much intoxicated as to fall from his horse several times in his way home; and was at last taken up by a neighbour, and put to bed in a house on the road. He fell asleep; and dreaming that he had fallen into a furnace of boiling wort, he was put into so great a fright that, struggling with all his might to call for help, he actually did articulate aloud, and recovered the use of his speech from that moment as effectually and perfectly as he had ever had it in his life.*

Singular
case of
sudden re-
covery.

For habitual hoarseness, leading to the present affection, the siliquosæ offer the best class of medicines; and, with respect to many of them, there is no great difference, except what results from their greater degree of acrimony. It is common to all these, on being swallowed, to stimulate the fauces, and especially their mucous glands, and thus to excite a more copious excretion of mucus. Of this family of medicines the *erysimum officinale*, or hedge-hyssop, was at one time in higher reputation for habitual hoarseness than any of the rest: and Dr. Cullen seems disposed to support this preference, chiefly upon the ground of its being less violent in its stimulant power than the generality of them. He recommends the juice of this plant, mixed with an equal quantity of sugar or honey into a syrup. And where the *erysimum* is not at hand, he recommends its place to be supplied with a syrup of horse-radish, but made weak, so that it may be frequently used, or long continued, without rendering the fauces sore or uneasy.† For this purpose a drachm of the root, fresh and scraped, may be infused in four ounces of boiling water for two hours in a close vessel, and made into a syrup with double its weight of sugar. Of this a tea-spoonful, swallowed leisurely for a dose, will often be found highly serviceable.

Remedial
process.

*Erysimum
officinale.*

Syrup of
horse-
radish.

We sometimes meet with a debility in the organs of the voice which reduces it to a whisper, without being able to ascribe it to any particular cause. This is often temporary, and seems to occur from a sudden deliquium of nervous power in these organs; as when, in the middle of speaking or reading,

J D. susur-
rans enervis.

* Phil. Trans. vol. xlv. 1747-8, p. 148.

† Mat. Med. part ii. class v. p. 166.

GEN. V.
SPEC. I.
D susur-
rans enervis.
Singular
recovery.
Farther
illustrated.
Treatment.

and this too in an agreeable tone, the voice abruptly fails, and is as abruptly resumed. In the case of the orator Gracchus, to whom I have just adverted, Pliny informs us, that the voice was restored by the sound of a pipe, that, being struck by his servant, gave the proper pitch. In some instances, however, this failure of the voice has been more or less permanent or intermissive. I had lately a lady under my care, of about forty-five years of age, who was usually attacked in sudden and irregular paroxysms, each continuing for several weeks. Repeated blisters, stimulant astringent gargles, as of port wine or alum water with tincture of myrrh, and a steady perseverance in a tonic regimen and pure country air succeeded. She recovered by degrees the full power of her voice, which, during the paroxysms, was nothing more than a weak and almost inaudible whisper; and has had no return of the affection for several years. In another case of the same kind, adverted to in the Nosology, the same plan proved less successful. The patient was a gentleman of about forty years of age, otherwise in good health, who had never spoken, except in a whisper, for more than eight years. [In cases of this description, electricity and galvanism, and tonic medicines might be tried; and, in a few examples, the editor has known the application of strong liniments, blisters, and antimonial ointment to the integuments covering the larynx, restore the voice to its proper strength.]

SPECIES II. Dysphonia Puberum.—*Change of Voice.* *Voice of Puberty.*

The voice dissonant and untrue to itself, irregularly alternating from harsh to shrill: confined to the age of puberty.

Sympathetic connexion of the sexual system with the vocal and other organs.

Character and proximate cause of the affection.

Origin of the affection explained.

Requisites to a perfect voice.

THE change that, during the period of puberty or adolescence, takes place in the sexual system for the purpose of giving perfection to its organs, is well known to be connected, by sympathy, with an equal change in various other parts of the body. In females, the breasts assume a soft and beautiful swell, and the nipples a pleasurable irritation. In males, the chin is covered with a beard, and the voice becomes fuller, deeper, and more sonorous. Before the voice, however, acquires this important change, it often exhibits great irregularity; and the youth, incapable of modifying his own tones, passes abruptly from harsh to shrill, and from grave to acute. And it is this irregularity and uncontrollable dissonance of voice, which constitutes the present species.

There is no great difficulty in accounting for this abnormal state of the voice at the period before us. The glottis is nearly as complicated in its structure as the eye or the ear, and the modulation of its tones depends upon an equal degree of elasticity and pliability in all its moveable parts, and in their perfect submission to the authority of the will. To the attainment of a correct voice it is necessary, that there should be great accura-

cy of ear; a perfect symmetry of the vocal organs; equal tenseness in the ligaments of the larynx, which must be also nicely balanced by the powers of the muscles on each side; the cartilages of the larynx must be delicately adjusted to each other; the lateral cavities equally deep, and the cornua of the os hyoides of a like length. With such an organization, the voice is perfected for exact modulation in speaking or singing; and it is from different defects in this requisite mechanism, that some persons cannot speak, and others cannot sing in tune.

GEN. V.
SPEC. II.
Dysphonia
puberum.

Now in the change that takes place during puberty, every part does not always harmonize with the rest; some parts become more tense, others less, and yield more easily; some are more relaxed, others more contracted; and of the effect, producible by such a state of the glottis, a tolerably distinct idea may be formed from a remark of Dodart, that a variation in the capacity of the glottis, not exceeding the fifty-fourth part of a silk-worm's thread, or one three-hundred and fifty-fourth part of a hair, will occasion a difference of tone. Time, however, and repeated exercises of the will, usually triumph over these discrepancies, wherever they exist, in a few months; when the voice recovers its unity of tone, and becomes graver in proportion as its motive powers become firmer and denser; and hence the reason, why the voice of males is graver than that of females. In males, also, the glottis becomes more capacious, which forms another cause of gravity of tone. The deepest tones are struck by animals that have the largest glottis, as the phoca, the ox, the *ardea stellaria*; while singing-birds, which sound the acutest tones, have a glottis capable of the closest contraction. The deepest roarings are produced by animals, that have the cartilages of the trachea entire, or imbricated, or tessellated with bones, as the lion, the elephant, and the peacock.

Deviation
from these
requisites in
puberty.

The voice
of males
why graver
than that
of females.
Hence the
still deeper
tones of
some ani-
mals than
of others.

SPECIES III. Dysphonia Immodulata.—*Immelodious Voice.*

The voice permanently depraved, or inharmonious.

THIS species offers the six following varieties.

- | | | |
|---|--|--|
| α | Rauca. Rough or harsh voice. | The voice naturally or habitually hoarse, harsh, or rough. |
| β | Nasalis. Speaking through the nose. | The voice sent with a cracked and grating sound through the nostrils. |
| γ | Clangens. Squeaking voice. | The voice shrill and squalling. |
| δ | Sibilans. Whizzing voice. | The voice accompanied with a whizzing or hissing sound. |
| ε | Stertens. Guttural voice. | The voice accompanied with a snorting, snoring, guttural, or stertorous sound. |

GEN. V. ζ Palatina.
SPEC. III. Palatine voice.

The voice hoarse, obscure, indistinct, with a fissure or other defect in the palate.

Dysphonia
immodu-
lata.

General

remark.
Squeaking
voice, how
produced.

Harsh voice.

Whizzing

voice.
Guttural
voice.

Of most of these, the cause will be obvious from the observations already offered. Thus, the squeaking voice proceeds, ordinarily, from too narrow a glottis; the rough or harsh voice, from a glottis too wide, and not sufficiently moistened with mucous secretion. In the whizzing voice, there is too much secretion, but of too limpid a consistence.

The guttural, or stertorous variety is commonly the result of a relaxed glottis, or velum palati, with an accumulation of thickened mucus; and here local stimulants, astringents, and tonics, together with a steady and determined exertion to obtain a modulated voice, will frequently prove successful. If we put out of consideration a few cases, in which some fissures in the palate have been cured on the principles applied to the hare-lip, the obscure palatine voice, commonly congenital, but sometimes a sequel of lues, can only be assisted by filling up the fissure in the palate with a silver plate, properly secured by a spring, or, when necessary, by an entire false palate of the same metal. Yet the most dexterous artist will sometimes find his ingenuity unavailing, and the defect beyond his skill. The nasal voice is produced, ordinarily, by an obstruction of the nasal fossæ from condensed mucus, as in a cold of the head, a polypus, or some other organic defect; the remedy or removal of which, where this can be attained, will restore the voice to its proper clearness. In common language, we denominate this variety *speaking through the nose*, but most incorrectly; for it is occasioned alone by our not having the nasal passages clear; and consequently from not being able to speak through them with our usual facility.

Palatine
voice.

Nasal
voice;

incorrectly
called
speaking
through
the nose.

This last is often the result of affectation, or a foolish habit, not easy to be conquered when once acquired.

GENUS VI. PSELLISMUS.—DISSONANT SPEECH.

The Articulation imperfect or depraved.

In the preceding genus, the imperfection or depravity exists, not in the articulation, but in the sound of the voice; whence the distinction between that and the present is clear. Psellismus embraces two species; that of STAMMERING, and that of a VITIOUS ENUNCIATION.

1. PSELLISMUS BAMBALIA.

STAMMERING.

2. ————— BLÆSITAS.

MISENUNCIATION.

SPECIES I. Psellismus Bambalia.—*Stammering.*

The flow of the Articulation disturbed by irregular intermissions or snatches.

THIS affection may be regarded as a sort of clonic spasm, or St. Vitus's dance confined to the vocal organs, and offers us the two following varieties :

GEN. VI.
SPEC. I.

α Hesitans.

Hesitation.

β Titubans.

Stuttering.

In the HESITATING VARIETY, there is an involuntary and tremulous retardation in articulating peculiar syllables. The organs are generally too mobile and unsteady, and the will has lost its control over them, if it ever possessed any. By reverting to the remarks, made on *Dysphonia puberum*, the physiology of the affection will be easily understood. As bad habits are more readily learnt than good ones, because they are more striking, and more strongly arrest the attention, this complaint is often caught by imitation, and especially among children; who, for this reason, ought never to be intrusted in the company of a stutterer, till their speech has become steady and confirmed.

α P. Bambalia
hesitans.

Pathology.

In the SECOND VARIETY, we have a higher degree of stammering, than in the first; accompanied with more impetuosity of effort. It consists in an involuntary and tremulous reduplication of some syllables, alternating with a tremulous hurry of those that follow. "I would thou couldst stammer," says Shakespeare, with a striking illustration of this morbid affection, "that thou mightst pour out of thy mouth, as wine comes out of a narrow-mouthed bottle, either too much at once, or none at all."

β P. Bambalia
titubans.
Character.

The convulsive actions of the muscles of the glottis, and which are communicated to the other organs of speech, whether productive of the present or the preceding variety, may often be overcome by a firm and judicious discipline; insomuch that some of the most distinguished orators of both ancient and modern times are well known to have been subject to this affection in their youth. In ordinary conversation, or where a man has time to pick out single words, instead of speaking whole sentences, the stammerer always hesitates most; and hence always least where his attention is completely engrossed. On which account, there are many stammerers that scarcely utter a word in speaking without betraying themselves, who, nevertheless, sing, and enunciate the words of the song, without any hesitation whatever, their whole mind being led away with the tune, and a strong desire to keep in time and harmony; while there are others who hesitate as little in reading, the words being immediately before them, and their attention being swallowed up in the subject. One of the worst stutterers I have ever known, was one of the best readers of Milton's *Paradise Lost*. He was a scholar of considerable attainments, and had taken some pains with himself for his natural defect, but without success; yet the moment an interesting poem was opened, his de-

Defect may
be often
overcome.

Hesitation
most when
the words
are most
thought of
or hunted
for:
hence many
stammerers
sing well,

and others
read well.

GEN. VI.
SPEC. I.

β P. Bambia-
titubans.

Remedial
process.

Single words
to be re-
peated slowly,
and for
hours at a
time.

Haranguing
by the sea-
shore, or
by some
sonorous
waterfall.

fect completely vanished, from his being led captive by the force of the subject, and the great interest he took in this branch of polite letters.

This affords us one mean, therefore, of remedying the evil before us: the stammerer should learn by heart, and repeat slowly, whatever most arrests his attention. But, at the same time, the will must learn to obtain a control over the muscles of articulation; and, for this purpose, single words should be uttered for hours at a time, deliberately, and when alone; and perhaps too, as was the custom of Demosthenes, a practice of haranguing by the sea-shore, or on the brink of some awful waterfall, where the fearful noise and the magnificence of the scenery have a tendency to break in upon the habit, and render the conquest the easier, may be often found advantageous. It would at least stimulate the speaker to strain his voice to the full extent of its power, and thus fit him for public speaking before large bodies of people, where a loud and elevated voice can alone be heard distinctly; which was probably the chief object Demosthenes had in view; for we are expressly told, that his voice was weak, as well as his speech tremulous and hesitating. Adults, who have firmness and perseverance enough for the purpose, may undertake the task of disciplining themselves; but children should always be put under the care of a judicious tutor, whose best qualifications will be patience and good temper. A very few words only should be marked down at a time for trial, and these should be attempted separately; nor should a second lesson be entered upon till the first has been completely mastered, although the effort should demand many weeks, or even months. An acquisition of one lesson will always facilitate that of another.

Whether
an insuffi-
ciency of air
in the lungs
be some-
times the
cause of
stammering?

[Dr. M'Cormac has lately published some observations* on the present subject, which deserve careful consideration. He conceives, that the cause of stammering arises from an attempt to speak while the lungs contain an insufficient quantity of air. This habit, he says, is acquired from undue haste and imitation; and the successful method of treatment consists in making the patient always inhale a proper quantity of air into the lungs before he attempts to speak, and to direct him always to pronounce very slowly, until the bad habit is broken. When the patient stutters very much, the practice of making long inspirations and expirations is stated to be a good preliminary exercise. The main thing to be attended to, and what in fact is the groundwork of the whole system of cure (Dr. M'Cormac says,) is to expire the breath strongly each time when attempting to speak, the lungs being previously filled to the utmost. As it will be some time before the patient can husband the air of his expirations, so as to say all he would wish in one breath, he must not commence by repeating sentences during each expiration, but only simple monosyllabic sounds. During the inter-

* Treatise on the Cause and Cure of Hesitation of Speech, or Stammering. Lond. 1823. 8vo.

vals, all conversation should be avoided, until the cure is somewhat advanced. It appears to the editor, that, although the practice here inculcated is unquestionably right, the theory, on which it is founded, is not altogether so free from doubt. While the practice, recommended by Dr. McCormac, comprises slowness and deliberation, which are, indeed, indispensable parts of it, the theory of the lungs not having air enough in them, and of this being the cause of the infirmity, may not be correct. The voice of some stammerers, whom the editor has known, has been so strong as scarcely to justify such a conclusion; and he is still inclined to believe, that a want of proper control over the muscles, concerned in articulation, must be regarded as the chief cause of the present affection. At the same time it must be granted, that the attempt to speak while the lungs have so little air in them, that an interruption will arise from the necessity of a fresh inspiration, cannot fail to embarrass a person addicted to stammering. The practice inculcated, therefore, is in every respect commendable, and the suggestion of it highly meritorious.]

GEN. VI.
SPEC. I.
β P. Bam-
balia
titubans.

SPECIES II. Psellismus Blæsitæ.—*Misenunciation.*

Articulate sounds freely, but inaccurately enunciated.

THE elementary articulate sounds, which the organs of speech are capable of enunciating, are but few; and hence they are the same in all languages, which are alone founded upon them; differently, indeed, modified in several of them, and with a difference of number in still more: for diversities of language consist, not in different sets of articulations, to which the vocal organs are not competent, but only in their different modes of combination, and the different ideas which such combinations indicate. So seven notes comprise the whole of music, and, by their different arrangements, produce that variety of harmony which we admire in the works of Handel or Mozart. If we would ascend higher than eight notes, we only commence another series of like proportions. In the same manner, to quote the words of the author of *Hermes*, "it is only to about twenty-four plain elementary sounds that we owe that variety of articulate voices, which have been sufficient to explain the sentiments of so innumerable a multitude as all the present and past generations of men."*

Elementary
articulate
sounds few:
and the
same in all
languages:
chiefly
diversified
in number
and import.

Amount to
about
twenty;

The twenty-four plain elementary sounds here referred to, are those which are denoted by the letters of the greater number of our European alphabets. Yet of these many are rather mere modifications of other sounds, than distinct sounds in themselves; insomuch that the ingenious Wachter has endeavoured to reduce the twenty-four to ten primary articulate enunciations, and to show, that these alone would be sufficient

and are
denoted by
the letters
of the
alphabet.

The twenty
reducible to
ten.

* Book iii. chap. ii. p. 324.

GEN. VI. for the purposes of the most polished languages; and consequently, that an alphabet of not more than ten marks or signs SPEC. II. might be sufficient to express its entire range.* In making this Psellismus reduction, he regards all the five vowels as modifications of Blæsitas. each other, or rather of one common articulation, the simplest belonging to the organs of speech, formed with least difficulty, and, on this account, composing a very great part of the languages of savage nations. In like manner, he regards all the gutturals as only modifications of another common articulation, as K, C, CH, Q, G, H. So B and P have nearly a common sound; as have D and T; and PH, V, and W. While L, R, S, M, and N, are distinct articulations, and will not readily blend with any others.

How so reduced by Wachter.

So, ten numerals are sufficient for arithmetic. Number of combinations capable of being produced by twenty-four letters.

These, no doubt, might be sufficient for all the purposes of speech; for we find, that ten simple numerals are adequate to all the purposes of arithmetical calculations, which extend to infinity; and that able mathematician Tacquet, who has worked the problem for the purpose, informs us, that the combinations, capable of being produced by the ordinary series of twenty-four letters, amount to no less than 620,448,401,733,239,439,360,000, without any repetition.† So that the richest vocabulary has made but a small inroad into that inexhaustible mine of wealth, which the wisdom of Providence has bestowed upon the few distinct and primary sounds, be they more or less, which the vocal organs of man are capable of articulating; thus devising a plan, which is equally entitled to our admiration for the simplicity of its design and the comprehensiveness of its power.

As the elementary sounds differ in number in different languages, so must the letters of their alphabets.

Phœnician.
Samaritan.
Chaldean.

Hebrew.

Hence alphabets for the most part derived from the Phœnician.

I have observed, that some languages have more elementary sounds than others; and as these are expressed by elementary characters or letters, it follows, that some languages must also have a more extensive alphabet than others. The proper Phœnician alphabet, which is, perhaps, the oldest of which we have any distinct account, seems to have consisted of not more than thirteen letters at first; it had afterwards three added to it, making sixteen in the whole; and, in this state, it seems to have been earliest employed by many of the adjoining countries, and is distinguished by the name of the Samaritan or ancient Hebrew: for the terms and characters of this last are so nearly those of the Phœnician in its improved form, that it is difficult and altogether unnecessary, to make a distinction. The Chaldeans introduced some change into the shape of the letters, rendered them more elegant, and added six other letters, as the Samaritan alphabet did not seem sufficiently full to express all the articulations of their speech; and the Jews, during the Babylonish captivity, readily adopted the improvement, and have continued the Chaldaic characters in their writings ever since. And in this manner, with various changes and augmentations, the Phœnician alphabet can be traced through eve-

* Nat. et Script. Concord. p. 64. Astle, Origin and Progress of Writing, p.

20. † Arithmeticae Theor. p. 517, edit. Amst. 1704. Astle, ut supr. p. 20.

ry part of ancient and modern Europe, every region of Africa where writing of any kind is current, and the western countries of Asia.

Over a very extensive portion of this last continent, however, we meet with an alphabet that has no common origin or conformity of principle with any hitherto described. This is the Nagari, or Devanagari, as it is called by way of pre-eminence. It consists of not less than fifty letters, of which sixteen are vowels, and thirty-four consonants, all arranged in the order of the alphabet with a systematic precision that is to be found no where else. The vowels take the lead, beginning with those most easily uttered, and terminating with those that approach towards a consonant sound. The consonants then follow in five regular series of gutturals, compounds, palatines, dentals, and labials; the whole closing with letters symbolical of sounds that do not exactly enter into any of the preceding series, and which may be regarded as a general appendix. This alphabet is asserted by many learned Bramins to be of a higher antiquity than any other; and there can be no doubt, that it has a just claim to an exceedingly remote date. But its very perfection is a sufficient confutation to its having been invented first of all. Something far more rude and incondite must have preceded, and paved the way for it; and, in the complex characters of which it consists, we seem to have the relics of those emblematic or picture-symbols, which there can be little doubt were first made use of; which are still employed by the Chinese and the uncivilized tribes of America, and seem to have laid a foundation for alphabetical characters in every quarter of the world. With a few trivial variations, this correct and elegant alphabet extends from the Persian Gulf to China; but it has no pretensions to rival the antiquity of the Phœnician. It is unborrowed, but of later origin.

Whatever be the number of simple articulations that enter into the constitution of a language, or however modified in enunciation, they can only be learned with accuracy in early life, when the vocal organs are most pliable, and the untutored infant is most prone to imitation. And hence, unless care be taken to imprint upon the organs of speech a just and correct enunciation of the first elements of words at this time, it is with great difficulty that the art can be acquired afterwards. This occurs to us under the best and most favourable circumstances. Foreigners coming into our own country after the age of thirty, though urged by an ardent desire of speaking English, seldom pronounce the language tolerably. An Englishman at the same age can hardly be taught to utter the guttural sound which the Welshman gives to the Greek χ , or even the French sound of the vowel u : and of the stray and solitary savages that have been caught in the forests of Lithuania, and a few other regions, there is not perhaps a single instance of their having been able, after the age of manhood, to articulate any language so as to be understood with facility.

But we sometimes meet with less favourable circumstances to

GEN. VI.

SPEC. II.

Psellismus
Blæsitas.

Some not,
as the De-
vanagari.

Its compli-
cation, yet
systematic
arrange-
ment.

Something
ruder and
simpler
must have
preceded.
Picture-
characters.

Simple arti-
culations
can only be
accurately
acquired in
early life.

Hence the
importance
of giving a
just enun-
ciation in
infancy.

And so-
reigners
older than
thirty, rare-
ly attain
the correct-
ness of
natives.

GEN. VI.
SPEC. II.

Psellismus
Blæsitas.

Peculiar
difficulties
to an acqui-
sition of cor-
rect sounds.

Vitious
enunciation
in teachers.

Want of
harmony in
the organs
of articula-
tion.

Structural
defect.

Many vocal
sounds call-
ed simple,
require the
concurrence
of two or
more
organs.

Example in
the English
th.

The Ger-
man *ch*, and
sch.

The operose
sounds are
themselves
often varied
by modifica-
tions.

Hence pro-
vincialisms
and dialects.

Division of
articulate
sounds.

an acquisition of proper articulate sounds, and this too in a state of childhood, which is the immediate age of imitation. For, firstly, we sometimes see children, brought up under the care of those who have a vitious articulation themselves, from whom they will be sure to catch it; and hence those pronunciations and rude dialects that are so frequently found in the remoter and less polished districts of almost every extensive people. Secondly, we occasionally meet with some natural disability or want of harmonious power in the organs of speech themselves; one or two of them evincing a greater mobility than the rest, and consequently taking the lead of them, and interfering with their office. And, thirdly, there is not unfrequently a defect of structure in the organs of articulation, as a want or loss of the fore-teeth, or a fissure in the palate or the lips.

Many of the articulate sounds moreover in most, perhaps in all, languages, though called simple, are produced by the joint exertion of two or more distinct organs: and unless these organs precisely accord in flexibility and power, and are equally under the command of the will, the sound will be imperfectly imitated. The Arabic and the Saxon sound, in English expressed by *th*, is an articulation of this kind, being compounded of a dental and an aspirate or guttural sound. From early habit, the natives of both countries are able to enunciate it perfectly, and they enunciate it alike. But there is scarcely an individual in any other country, who can ever be taught to sound it accurately, unless he should have an opportunity of trying it in early life; for the motive powers concerned in the sound will not move in sufficient unison. For the same reason, it is as difficult for a foreigner to catch the German *ch* in the pronoun *ich*, the *sch* in *schützen*, or both in *schädlich*, or *schmächtigkeit*. But even these combined sounds have sometimes shades of distinction which constitute other sounds, and are expressly intended to do so; and, in such cases, the difficulty of an accurate enunciation is greatly enhanced. Thus the English *th* in *thing*, and in *thou*, is a different articulation; and the Arabians, who have both, express them by different marks or letters; which, if expressed by our own letters, would perhaps be best written *dth*. And it is on this account, that where a common language spreads over different countries, as the Arabian, or different parts of a country, which formerly made use of a diversity of tongues, as the English, varieties will necessarily take place in the utterance; and the dialectic may be more in favour than even the original or normal enunciation. There are some persons who prefer the English of Edinburgh to that of London; and the Arabic of Delhi, Ispahan, and Constantinople has modifications of sounds as well as of inflexions, which, though regarded as barbarisms by a native of Cairo, are contemplated as excellencies by those who make use of them.

The organ, chiefly employed in the articulation of sounds, is the glottis; and subordinate to this are the fauces, the nostrils, the tongue, the lips, and the teeth. And hence the division of articulate sounds into VOWEL or VOCAL, which are formed by the

glottis alone, and are the simplest of all sounds; GUTTURAL, or those which are formed in the fauces more or less acting conjointly with the glottis, of which the fauces are only a continuation, as *h, ch, q, g, h*; NASAL, as *m, n*, and the compound *ng*; LINGUAL, as *l* and *r*; LABIAL, as *b, p, f, v, w*; and DENTAL, as *c, d, t, z*.

GEN. VI.
SPEC. II.
Psellismus
Blæsitas.

If we were to be more particular than we have time to be, or than is necessary, it would not be difficult to derive very numerous examples of vitious enunciation, and consequently varieties of the species of morbid utterance before us, from every one of these divisions; but the following are the chief which occur in our own tongue, and those that are cognate with it:

| | |
|-----------------|---|
| α Ringens. | Vitious pronunciation of the letter R. |
| β Lallans. | Vitious pronunciation of the letter L. |
| γ Emolliens. | Vitious substitution of soft for harsher letters. |
| δ Balbutiens. | Vitious multiplication of labials. |
| ε Mogilalia. | Vitious omission of labials, or exchange for other letters. |
| ζ Dentiloquens. | Vitious employment of dentals. |
| η Gutturalis. | Vitious pronunciation of gutturals. |

The VITIOUS PRONUNCIATION OF THE LETTER R is produced by a harsh or aspirated vibration or redoubling of it. Examples of this inelegance are common to several of the northern provinces of our own country, as it is to the ruder provinces of France. Among the Greeks from the letter ρ (*ro*) it was denominated rotacismus, and was common to the Eretrienses in the island of Eubœa. It is generally ascribed to the possession of too large and tardy a tongue. But it is rather produced by pressing the point of the tongue downward towards the root of the teeth of the lower jaw, instead of upwards, with a slight vibration towards the palate.

α P. Blæsitas ringens.
Explanation.

Cause.

In the SECOND VARIETY of vitious enunciation, the letter *l* is rendered unduly liquid, or substituted for an *r*. As when delusive is pronounced deliusive, as though the *l* possessed the power of the Spanish *ll*, or the Italian *gl*; or as when parable is pronounced palable. Alcibiades is said to have laboured under this defect. The Greeks, from the letter λ (*lambda*) denominated this *lambdacismus*; the Romans, with more severity, *lallatio*, or *lullaby-speech*. This is often the result of affectation; sometimes perhaps from not having the tongue sufficiently free, as where there is too great a breadth of the frænum which ties it to the base of the mouth, or too large and oppressive a flow of saliva. As the articulation of *r* does not enter into some languages, as those of Mexico and China, the *l* is often substituted for it; hence the Jews of the former country, who, from long disuse, have lost the power of pronouncing the *r*, employ the *l* in its stead; and for אשרי האיש אשל in the opening of the first psalm read אשלי האיש אשל.

β P. Blæsitas lallans.
Explanation.

Cause.

In the NEXT VARIETY, the harsh letters are vitiously dropped for softer; as in the substitution of anzel for angel; capidol for

γ P. Blæsitas emolliens.

GEN. VI.
SPEC. II.

γ P. Blæsi-
tas emol-
liens.

Comparison
of the most
polished
with the
most bar-
barous
tongues.

Softness of
the Otahei-
tan lan-
guage.

δ P. Blæsi-
tas balbu-
tiens.

Explained.
Examples.

Often used
by infants.

capitol; *dat* for *that*. This may be the result of a debilitated articulation in children who have been brought up too daintily; but it is more usually the result of affectation; or is founded upon a general principle of softening the rougher or harsher sounds of a language into a smoother and more limpid flow; as is the case with most of the modern dialects of the south of Europe, and particularly those of Italy and Spain, which are well known to be derived from the Latin. Thus in the former we have *piano* for *plano*; *piangere*, and still farther *piagnere*, for *plangere*, and *egli* for *ille*: and in the latter *llamar* for *clamare*; *llaga* for *plaga*, and *hermosa* for *formosa*.

It is curious to observe how, in this respect, the most barbarous and the most polished languages agree. It is generally, but erroneously conceived, that the former are peculiarly harsh and dissonant; for savages, in speaking, as in any other exertion, take no more pains than are absolutely necessary, and hence content themselves with the soft and simple vowel sounds, or those of the glottis, drawled out indeed at too great length; and when they are driven to the use of consonants, select those that give them least trouble to enunciate. On this account Lord Monboddo is correct in observing that "the words of barbarous languages are long, and full of vowels; not short, and full of consonants, as has been imagined."* And the following remark of my excellent and distinguished friend Dr. Perceval of Dublin, in the manuscript commentary with which he favoured me on the volume of Nosology, already spoken of in the Preface, is peculiarly in unison with this statement:—"In a paralytic affection of the organs of articulation, the patient pronounced the word *cocoa*, *toto*. The Otaheitans call *Cooke*, *Toote*. Their language is beautifully soft and vocal. A sentence, reported in *Cooke's* second voyage, is distinguished by the harmonious and expressive collocation of its words: '*Tootaha, taio Toote—mutte Tootaha*.'—*Tootaha*, the friend of *Cooke*—*dead* is *Tootaha*." Man in savage life is fond of ease, and would not move a muscle if he could help it; in the voluptuousness of polished life he loves it equally, and is, if possible, still less disposed to exertion; and hence this extraordinary accordance in the character of their articulations.

In the BALBUTIENT VARIETY, we have the labial letters too frequently repeated, or enunciated too harshly, or used instead of other letters. The Welsh are proverbially addicted to this inelegance, by confounding the *v* with the *f*, and the *b* with the *p*; of which Sir Hugh Evans, in the *Merry Wives of Windsor*, affords a correct and amusing example, "*Fery goot*," says he, "*I will make a prief of it in my note-book!*" So *impringe* is often used for *infringe*, and *ibory* for *ivory*. And thus *Veda* is pronounced *Beda*, and *Venares* *Benares*, in Bengal, the Bengalee having no such letter or articulation as *v*.

Infants before they cut their teeth are constantly using labials too freely, as the lips press together without resistance; and

* Origin and Progress of Language, second edit. vol. i. b. iii. p. 496.

hence they delight in iterating the same labial sound; and it is from a copy of such infantile iteration, that we derive the names of pa-pa and ma-ma which they first learn to utter: for the original Hebrew terms, from which these names have descended to Europe, and indeed to most other parts of the world, savage as well as civilized, are without any iteration whatever, being simply **אב** (*ab*) **אם** (*am*); the first importing *love*, and the second *sustenance*, in Syriac rendered *aba* or *abha*, and *ama*; and the same in Chaldee: whence the Greek terms and their correlatives **παπα** or **παππας** and **μαμα** (*pappa* or *pappas* and *mamma*) produced by a mere infantine balbutiation, or substitution of *p* for *b*, in the first term, and a reduplication of the consonant in each: and hence, too, *am-o*, and *am-or* in Latin.

Persons in a state of intoxication, from the tremulous debility of their lips, often exhibit the same reduplication of the labial sounds; and thus make an approach towards one of the varieties of the last species. It is also often to be found in persons whose lips are unduly thick and broad, a deformity distinguished vernacularly by the name of blobber-lipped: to which cause Quintilian, who notices this variety of vitious expression, chiefly ascribes it, and hence distinguishes it by the name of *plateiasma*, probably from Theocritus:

Τρυγones εκκναισευντι πλατυαδοισαι απαντα.*

Cooing like pigeons with your blobber-lips:

A verse designed to ridicule the Doric dialect, and consequently intimating, that this kind of vitious enunciation was common to a considerable part of Achaia.

The erroneous articulation constituting the NEXT VARIETY, is of a character precisely opposite to the preceding; and consists in omitting the harsher labials altogether, or exchanging them for others that are softer and more easily uttered.

Thus *mantle* is broken down into *antle*, *fish* into *vish*, and *pilfer* into *filfer*. So in the Spanish the Latin *farina* becomes *harina*, and *faba*, *hava*, and in French the Latin *sibilo*, *siffler*. This blemish is especially common to those who are hare-lipped, or have any other kind of defect in either lip, so that the two will not play in harmony; and more particularly still, if any of their front teeth be wanting.

In the DENTILOQUENT VARIETY, the dental sounds, as of *c*, *s*, *t*, *z*, are too frequently employed, producing the effect of what is called lispings, or, in common language, speaking through the teeth. This, also, is often an affected blemish, as though it were an elegance, instead of a fault in enunciation. It is produced by having a tongue naturally too long, and hence perpetually thrust against the front teeth from necessity, and from a habit of pressing it in this direction too frequently.

The GUTTURAL or PALATINE LETTERS, as *g*, *h*, *j*, *c*, *x*, are sometimes uttered imperfectly, by being introduced where they

GEN. VI.
SPEC. II.

§ P. Blæstas balbutiens.

Hence the names of *papa* and *mamma* as altered from the original Hebrew.

Multiplification of harsh labials.

Other examples in persons labouring under intoxication.

In persons with broad thick lips.

§ P. Blæstas mogialia. Explana-tion.

Examples.

§ P. Blæstas denti-loquens.

Explained.

§ P. Blæstas gutturalis.

GEN. VI.
SPEC. II.

„ P. Blæ-
sitas gutto-
ralis.

Explained.
Examples.

ought not, or withheld where they should be distinctly enunciated; and in this consists the last variety it may be necessary to notice.

One of the most common examples is in the superfluous use of the aspirate, or *h*, by means of which exalt and exasperate are pronounced *exhalt* and *exasperate*; so collar is called *khollar*, and custom *khustom*. And not unfrequently among men of unfinished education, the aspirate is just as uniformly omitted where it ought to be employed, as employed where it ought to be omitted; whence for this sentence, “the upper part of the house is to be let unfurnished,” we have “the *hupper* part of the *ouse* *his* to be let *hunfurnished*.” And if the palate be fissured, or in any other way imperfect, “ghost” is pronounced “host,” “jolly,” “iolly,” or “yolly,” “coffee,” “dhoffee,” “Xerxes,” “Zherzes.”

Remedial
intentions.

Where these defects depend on organic misformation, they will mostly be found without a remedy, though they may be palliated by a laborious discipline. Where they are the result of debility or vitious habit, the remarks, with which we closed the preceding species, will be equally applicable here.

CLASS II. PNEUMATICA.

ORDER II.—~~P~~neumonica.

AFFECTING THE LUNGS, THEIR MEMBRANES OR MOTIVE POWER.

The Respiration irregular, impeded, or painful.

THE idiopathic diseases, that appertain to this order, differ very widely in their respective degrees of severity and danger; and, upon the whole, are but few; though the number is very considerable in which the lungs and their auxiliary powers are deeply implicated, by sympathy or continuity, in disorders that originate in other organs, and primarily affect other functions. The genera are as follow:

| | |
|-----------------|--------------------------|
| I. HÆM. | COUGH. |
| II. DYSPNŒA. | ANHELATION. |
| III. ASTHMA. | ASTHMA. |
| IV. EPHIALTES. | DAY-MARE. NIGHT-MARE. |
| V. STERNALGIA. | SUFFOCATIVE BREAST-PANG. |
| VI. PLEURALGIA. | STITCH. |

GENUS I. BEX.—COUGH.

Sonorous and violent expulsion of Air from the lungs.

THIS genus of diseases was by the Latins named *TUSSIS*, a term, that has been more generally employed by nosologists, than any other. I have ventured, however, to restore the Greek name *BEX* (ΒΗΞ) for the sake of uniformity; so that the generic terms may all be derived from a single tongue.

Cough, defined as above, is well known to accompany, as a symptom, a great multiplicity of other affections, some of which are very remote from the seat of coughing. Thus it occurs to us in pleurisy, in pneumonitis, hepatitis, paristhmitis, empyema, asthma, catarrh, phthisis, hæmoptysis, hysteria, helminthia, and dropsies of various species. Hence Dr. Cullen has omitted cough as an idiopathic affection, and has only introduced it as a symptom or synonym of catarrh; although it belongs at least as much to phthisis, and perhaps to every one of the diseases just enumerated: but Dr. Cullen's system did not allow a place for cough as a primary disease; and in this, as in various other cases, he was obliged to bend to the force of necessity.

Cough, undoubtedly, occurs in its most frequent appearance as a symptom of some other complaint; but it is at times as truly idiopathic as any complaint whatever, and ought to be treated of as such. Under this form, its seat is in the chest; and the parts principally affected are the trachea, bronchiæ, the membranes, and substance of the lungs. In the act of coughing, the lungs, like the stomach in vomiting, continue inert; and the active or convulsive part, by which the lungs are emptied, is performed by the muscles of respiration.

"It is not necessary," observes Mr. John Hunter, "that the stomach should act violently to produce the evacuation of its contents; nor is it even necessary that it should act at all: for the lungs themselves do not act in the least when any extraneous matter is to be thrown up: and coughing is to the lungs what vomiting is to the stomach. The muscles of respiration are the active parts in emptying the lungs, and can act naturally and preternaturally. The action of vomiting is performed entirely by the diaphragm and abdominal muscles; and we know by the same action that the contents of the rectum can be expelled."* In the Physiological Proem to the present class I have endeavoured to establish this remark in respect to the lungs; and under the species *EMESIA*, in the preceding class, I have noticed experiments of M. Magendie that confirm Mr. Hunter's opinion in respect to the stomach.

Generally speaking, idiopathic cough is not dangerous in itself, or while running its regular course; but it has often proved highly dangerous in its results, by superinducing peripneumony, hæmoptysis, hectic fever, or phthisis.

The whole of these remarks apply not more to common coughs, than to pertussis or whooping-cough; which unquestionably, there-

GEN. I.
Bex as a
generic
name pre-
ferred to
tussis.

Common as
a symptom
to many
other com-
plaints.

Hence re-
garded by
Cullen as
symptoma-
tic alone.

Yet at times
truly idio-
pathic.

Seat and
part af-
fected.
Lungs inert
in coughing,

as the
stomach in
vomiting.

Acted upon
by the
muscles of
respiration.

Rarely
dangerous
in its regular
course; but
often so in
its results.
Whooping-
cough pro-
perly ranged

GEN. I.
Bex.
under the
present
genus.

fore, ought to be arranged as a species under the present genus. In truth, the commencement of both is in most cases so much alike, that it is often impossible, and always difficult, to distinguish them: both are, in many cases, accompanied with a slight degree of fever; the most obvious and assignable cause of both is cold; I mean, where the hooping-cough is original; and in both, the sonorous fits, how much soever they may differ in violence and a few other circumstances, are produced by a spasmodic action of the same muscles.

Thus explained, the genus bex or tussis may be divided into the three following species:

- | | |
|------------------|------------------------|
| 1. BEX HUMIDA. | COMMON OR HUMID COUGH. |
| 2. — SICCA. | DRY COUGH. |
| 3. — CONVULSIVA. | HOOPING-COUGH. |

SPECIES I. Bex Humida.—Common Cough. Humid Cough.

The cough accompanied with an expectoration of a mucous or serous fluid.

How called
by the
Greeks.

To this species the Greeks gave the name of anaptysis, and anacatharsis; which last has been copied by Sauvages, and appropriated to the present purpose. The species affords us four varieties; one entonic, or accompanied with an excess of power, and three atonic, or distinguished by enfeebled action.

- | | |
|---------------------|---------------------------|
| α Mucosa. | Common mucous cough. |
| β Anhelans. | Chronic cough of old age. |
| γ Acrida. | Frothy saline cough. |
| δ Periodica. | Nervous cough. |

α B. humida
mucosa.

In the FIRST VARIETY, the discharge is chiefly mucous, and excreted freely. The exhalants of the bronchiæ are stimulated by an irritation of some kind or other, frequently by a reverse sympathy, in consequence of cold and torpid feet, to act more powerfully than in a state of ordinary health, whence the bronchial vessels become overloaded, and relieve themselves by an expectoration, that takes place freely and without the hoarseness which usually accompanies catarrh, or any other very troublesome disturbance of the respiratory organs.

The bron-
chial vessels
become
overloaded.

β B. humida
anhelans.

There is another variety, commonly called the CHRONIC COUGH OF OLD AGE, in which the cough occurs in long paroxysms, with a viscid and mucous discharge, excreted with difficulty and laborious breathing. Here the bronchial secretion of mucus is perhaps less copious than in ordinary health; and, being peculiarly tenacious, is thrown up with great labour and repeated efforts. This kind of cough is particularly common to persons in advanced life: or, whose lungs or bronchial vessels are rendered weak and irritable from a neglect of common mucous coughs; which have at length run into the present variety, and become almost habitual; showing themselves on every change of the atmosphere; and particularly during the inclemency of winter.

Bronchial
secretion
less than in
ordinary
health.
Common to
advanced
life.

In the THIRD, OR ACRID VARIETY, the fluid coughed up is thin, frothy, and saline; and for the most part excreted with difficulty. It is evidently, like the last, an atonic affection of the lungs; though often produced by diseased action in some remote organ with which the lungs associate. It is hence sometimes found in transferred gout, and still more frequently in cases of diseased liver; especially where the liver has been affected from a habit of ebriety; and, in these cases, it is peculiarly troublesome on first rising from bed in the morning. There is, as I suspect, in this form of humid cough, not only great torpor and imbecile action in the mucous membrane of the lungs, but a depraved secretion, small in quantity, and thinner and more acrid in quality than it ought to be.

This cough is sometimes extremely pertinacious. Dr. Darwin tells us that he met with it twice in the same person, at a distance of some years, during a fit of gout, so intractable as to resist venesection, opiates, bark, blisters, mucilages, and all the usual methods. It was, for a time, supposed to be the whooping-cough, from the violence of the spasmodic fits of coughing: it continued two or three weeks, the patient never being able to sleep more than a few minutes at once during the whole time; and never for a moment, unless propped up in bed with pillows.*

There is another variety of the present species to be met with, which develops a striking tendency to recur at STATED PERIODS. The cough, instead of being violent, is here partly restrainable, and the discharge, though thin, is not acrid. It is the NERVOUS COUGH of Dr. Whytt, who, in his Treatise on Nervous Diseases, has described it with great accuracy and judgment. It is a frequent attendant upon persons of a nervous or irritable temperament, and hence common to the hysteric, dyspeptic, and choleric. Like the last variety, it is also occasionally found in repelled gout. There seems here, also, to be some depravation in the nature of the secretion, dependent on the debility of the secreting organs. And hence we sometimes find, that the morbid phlegm forms a nidus, as in various cases of phthisis, for the eggs of minute insects floating in the atmosphere, which are conveyed with the inspired air to the bronchial vessels; where they are hatched in the secreted fluid, and often thrown up in the shape of larvæ or maggots. In like manner, we sometimes meet with hydatids, formed and thrown up in the same way; of which we have a singular example in the Medical Transactions, in a lady, thirty-seven years of age, of a delicate constitution, and nervous or hypochondriacal habit. For half a year, she expectorated more or less of these in the midst of thick viscid phlegm, sometimes to the amount of twelve, fifteen, or twenty-four in a day, of various sizes, from that of a pea to that of a pullet's egg.

From the difference of causes and symptoms, which these varieties evince, a very different mode of treatment is evidently required.

GEN. I.
SPEC. I.

γ B. humida
acrida.

Character.
A disease
of debility.

The secretion proba-
bly de-
praved.

Peculiarly
pertina-
cious;

and from its
violent and
spasmodic
fits resem-
bling whoop-
ing cough.

δ B. humida
periodica.

Common to
those of a
nervous and
irritable
habit.

Secretion
probably
depraved.

Forms a
nidus for the
eggs of
insects.

Treatment
of humid
cough.

GEN. I.
SPEC. I.
§ B. humida
periodica.
Diaphoretics.
Warm bath.
Demulcents.

The first variety, produced by excess of action in the mucous membrane of the lungs, and mostly by sympathy with a remote organ, as in the case of cold and torpid feet, will be best relieved by diaphoretics and the warmer sedatives; and especially Dover's powder, which will restore to the system its harmonious balance of power. The warm bath, or bathing the feet in warm water; warm and copious apozems, and oily or mucilaginous demulcents, are also peculiarly adapted to this species of cough. At the same time, the bowels should be kept open by any gentle laxative, as the neutral salts, or the confections of cassia or senna.

Tartar
emetic in
large and
frequent
doses.

On the continent, it has lately been a very popular practice to employ tartar-emetic in preference to ipecacuan, whether alone or combined, as in Dover's powder, with opium. It has been given in all complaints of the chest attended with defluxion, and in all possible proportions: in some instances, so diluted with water as to form a part of the common beverage; and, in others, so concentrated as to rival our boldest wholesale prescribers of calomel. This is especially the practice of the supporters of the contra-stimulant Italian school. Thus Rasori has given a gradual increase of tartar-emetic, to the amount of two drachms a day; and, according to his account, without producing vomiting, except in the first instance. He adds, that when the patient gets better, the emetic property again comes into operation, and the remedy is left off. M. Peschier of Geneva has imitated this innovation. He declares bleeding to be useless, and that he cures all fluxions of the chest with tartar-emetic alone, which he gives in doses of fourteen grains in the day, without producing vomiting. And Dr. Duffin has lately informed us, that he swallowed from twenty to twenty-five grains of tartarised antimony by mistake, but without suffering from any remarkable symptom. From all which we may learn, I fear, that, in the present day, the powers of experiment are more widely afloat, than the powers of judgment and sobriety.

Expectorants.
Proper
meaning of
the term.

In the disease before us, we have also reason to expect benefit from many of the expectorants, properly so called: those medicines, which rather promote the separation of the viscid phlegm with which the bronchiæ are loaded, than simply inviscate or dilute it, though these are also treated of as expectorants by many writers.

Principle on
which they
act.
Probably a
specific
determination
to the
lungs.

The list of the proper expectorants employed formerly was very voluminous; in the present day, they are comparatively but few, and the proscription has, perhaps, been carried too far. The principle upon which they act is, in some degree, doubtful. The simplest way of accounting for it, is by means of a specific determination to the lungs. For as we have pretty clear proofs of medicines operating specifically upon other organs, as that of mercury upon the salivary glands, and cinchona upon the irritable fibre, there is no reason why we should not expect a like operation upon the viscera of the chest. Dr.

Cullen's
hypothesis
objected to.

Cullen is quite at a loss upon this subject, from not admitting of specific medicines, or a specific action upon any organ. As a

general rule, he supposes expectorants to operate on the bronchiæ merely by a diaphoretic power, or that of increasing the flow of the superficial exhalants at large, and consequently of the exhalants of the lungs, by which the mucus present in the follicles may be poured out in a less viscid form, and hence in a state to be more easily thrown up by the trachea.

But this is a very unsatisfactory view of the question. For, first, admitting that some medicines act directly upon the exhalants of the skin, a specific power is hereby immediately conceded to one set of organs; and if such a power exist in respect to one set, there is no reason why it may not in respect to fifty. Next, we see evident proofs of an expectorant power in many medicines, as in gum-ammoniac, where we have no proof whatever of increased exhalation from the surface of the body. And, farther, the general explanation gives us no clue to the different operations of particular expectorants.

It is possible, that in all these there is a peculiar stimulus; but whether this depends upon any sensible quality they possess, we cannot easily determine: for though many of them are more pungent to the taste than others, their degree of expectorant power does not in every instance keep pace with their degree of pungency.

In the variety, however, of a common mucous cough from cold, it is obvious, that, where expectorants are employed, they should be of a mild, rather than of an acrimonious nature, as we have already an excess of action to encounter. And hence honey, the rob or jelly of the sub-acid fruits, as currants or raspberries, liquorice-root, and perhaps hyssop, butterbur, and inula, may be used with advantage, though the virtues of the last two or three are but doubtful, notwithstanding the high repute in which they were held formerly. The officinal inula of our own day, however, does not appear to be that of the Latins; for among them its farina is represented as having been particularly sapid; so much so, indeed, as to have formed a favourite ingredient in the most celebrated sauces of their public feasts. Horace speaks of it in one place as possessing a bitter taste; for he thus makes an epicure boast of having invented the sauce:—

—INULAS ego primus AMARAS
Monstravi incoquere.*

And in another he describes it as acrid, or stimulating; for it is probably in this sense that the ACIDAS should be understood:—

—ACIDAS mavult inulas.†

While Lucretius makes it rather a mild general stimulant, or aromatic:—

—quæ
TITILLARE magis sensus, quam lædere possint,
Fæcula jam quo de genere est, INULÆQUE saporēs.‡

GEN. I.
SPEC. I.
Bex humida.

Expecto-
rants proba-
bly possess a
peculiar
stimulus.

In mucous
cough the
milder to be
preferred.

Treatment
of B. humi-
da mucosa.

Whether
the inula of
modern
medicine be
that of the
Romans in
their con-
diments.

* Sat. Lib. II. viii. 51.

† Sat. Lib. II. ii. 44.

‡ De Rer. Nat. II. 430.

GEN. I.
SPEC. I.
Treatment
of B. humi-
da anhelans.

But let the quality of the Roman inula be what it may, we do not seem to possess the plant in the almost tasteless and inert root, employed under this name in our own day.

Warm and
pungent ex-
pectorants.
Alliacea.
Gum-resins.

In the second variety, or chronic cough of old age, where the mucous discharge is peculiarly viscid, much smaller in quantity, and excreted with great difficulty and laborious breathing, and the general symptoms evince great torpor of the extreme vessels of the lungs, the warmer and more pungent expectorants can alone be of any service, as the alliacea, and stimulant gum-resins, especially ammoniac, benzoin, styrax, and, perhaps, all the turpentine modifications.

Tar.

Tar-water was at one time a famous remedy; but has long fallen into great disesteem. From its warm terebinthinate impregnation, and the approach it makes to camphor and the gum-resins just enumerated, it may doubtless prove serviceable in many cases. It is for the same reason that the vapour of tar, exhaled from a tin pan with an oil or spirit-lamp beneath, as recommended by Sir Alexander Crichton in phthisis, is, in the present cough, frequently employed with advantage. The *acidum abietis*, another old preparation of the same kind, seems, however, to be the most deserving of trial of all the terebinthinate forms, and has sunk into disrepute without reason: it is the peculiar acid liquor, yielded along with the essential oil, in distillation of the fresh branches or fruit of the *pinus silvestris* and *p. alba* of Linnæus. It is too acrid to be drunk alone, and is usually diluted with water: and combines in itself some portion of the terebinthinate oil with an acid very nearly resembling the acetous.

Acidum
abietis.

Treatment
of B. humi-
da acrida.
Need not
essentially
vary from
the pre-
ceding.
Narcotic
bitters and
simple nar-
cotics.
When symp-
tomatic, the
primary
disease to
be attended
to.
Illustrated.

The same tribe of medicines will generally be found useful in the third variety, or that in which the cough is followed by a thin frothy and saline excretion; for here we meet with as much local atony and torpor of the excretories as in the preceding. We may here also with advantage employ several of the narcotic bitters, and especially the hop, in the form of pills or tincture; and occasionally the narcotics themselves, as opium, or hyoscyamus, or the extract of the common potatoe, *solanum tuberosum*, as recommended by Dr. Latham.* But where the cough is dependent upon morbid affection of some remote organ, and the lungs are only influenced by sympathy, it is obvious, that our chief attention should be directed to the primary disease. I was lately called in to a young gentleman who was severely afflicted with a cough of the present kind, which allowed him no rest, and induced an apprehension of serious mischief in the lungs and considerable danger. On minutely examining the case, I found him labouring under a chronic hepatitis, which, in the more prominent symptoms of pulmonic disorder, had been overlooked. I directed my attention to the former disease alone, with the exception of giving opiates pretty freely as a palliative. The liver had all the external and internal tokens of inflammatory action; and from one or two

* Med. Trans. vol. vi. art. vi.

most violent fits of shivering and horripilation, which made the teeth chatter, I have no doubt, that suppuration took place to a certain extent. From this time the inflammatory symptoms ceased, and the cough was heard of no more: yet tenderness and defined tumour in the right hypochondrium remained for weeks before they entirely disappeared.

In the nervous or periodic cough, narcotics should be employed very cautiously, and only where the irritation is perpetual or otherwise unconquerable; demulcents will also be of no service. Though the warmer expectorants may be useful, our chief dependence must be on general tonics, as the columbo, cusparia, and cinchona, with which may be combined several of the metallic oxydes, especially those of bismuth and zinc. When the flowers of zinc were in the height of their popularity, they were supposed to be an unfailing remedy; and Dr. Percival, of Manchester, has given numerous examples of their complete success. By having been too highly advocated, this medicine has now fallen into an undue degree of disesteem. Camphor and volatile alkali will often prove palliatives for the cough, and may be occasionally had resort to; but moderate exercise and change of air should uniformly make a part of the tonic plan wherever the patient's means will allow.

In this modification of cough, more than in any other, we have reason also to expect benefit from a cautious employment of the prussic acid, which has the peculiar power of diminishing the general sensibility, without affecting the functions of respiration or circulation. Of all the cases published by MM. Magendie and Brera, in proof of its beneficial qualities, none are so decisive as those of chronic and nervous coughs.* Six drops of the acid, prepared according to Scheele's method, may be given in a wine-glass of infusion of cusparia every four hours.

GEN. I.
SPEC. I.

Treatment of B. humida periodica. Narcotics rarely to be employed. Demulcents of no use. Tonics advisable, both vegetable and metallic. Zinc, once too highly, now too little esteemed.

Prussic acid.

SPECIES II. Bex Sicca.—Dry Cough.

Cough unaccompanied with expectoration.

THE symptom in the definition sufficiently shows, that the seat of the disease is here, either in a remote organ or in the parenchyma, or general substance of the lungs; rather than in the mucous membrane of the bronchiæ. The disease is commonly, indeed, produced by some irritable substance generated within the lungs, as in the case of a scirrhus or calcareous affection of these organs; or conveyed into them from without, as is common to glass-cutters, hewers of free-stone or sandstone, workers of metals, and similar mechanics, in consequence of the finer particles of the materials, on which they operate, being occasionally inhaled with the inspired air, and afterwards making their way through the delicate tunics of the air-cells.

Seat of the disease.

Causes.

* Recherches Physiologiques et Cliniques sur l'emploi de l'Acide Prussique ou Hydro-cyanique dans le Traitement des Maladies de Poitrine, &c. Par F. Magendie, &c., 8vo. Paris, 1819.

GEN. I.
SPEC. II.
Bex sicca.
Often produced by a remote irritation.

The dry cough is also at times to be traced to a remote irritation, as that of worms or an inflammatory action in the intestines, liver, or other abdominal organs: in most cases, the lungs themselves are probably quite passive, and only yield to the propulsive action of the diaphragm, and its auxiliary muscles, to which the remote stimulus seems to confine its sympathetic power.

Sometimes by minute eggs inhaled with the air.
By edible substances that have slipped down by mistake.
Singular discharge of substances that have not entered by the mouth.

The minute and invisible eggs of various insects floating in the atmosphere, are also sometimes swallowed in like manner, and in a few instances hatched into larvæ, which have been thrown up by coughing.* Minute pieces of bone,† and the kernels of cherries and other fruits, have, moreover, occasionally slipped into the trachea accidentally; and, after exciting great irritation and a hard dry cough for a considerable period of time, have ultimately been thrown up.‡ A bean, in this manner dropped into the trachea, was rejected on the fifth day in a violent fit of coughing.§ It is more extraordinary that materials, introduced into or engendered in wounds in the thorax, should at times be found to work their way into the bronchial vessels, and in like manner be thrown up by coughing. Yet in this way have been discharged surgical tents that have slipped beyond the lips of the wound;|| and the splinter of a fractured rib.¶

The varieties chiefly worthy of notice are the three following:

- | | |
|--|---|
| <p>α Ingenerata. From ingenerate irritants.</p> | <p>From irritation produced locally, as a scrofulous, scirrhus, or calculous affection of the lungs.</p> |
| <p>β Extranea. From extraneous irritants.</p> | <p>From irritating materials inhaled from without, as in various operations on glass, metals, sand-stone, and marble.**</p> |
| <p>γ Verminosa. From remote worms or vermicules.</p> | <p>From some remote irritation, chiefly that of worms burrowing in the intestines, liver, or other abdominal organ.</p> |

General remarks and treatment.
When produced by worms.
Scrofulous state of the lungs.

Of these, the LAST is only to be removed by removing the primary disease. It is most common to children, and has the associate signs of a tumid belly, and pale emaciated countenance. For the medical treatment we must therefore refer to the genus HELMINTHIA, in the preceding class.

When the irritation proceeds from a SCROFULOUS OR CALCULOUS AFFECTION of the lungs themselves, our attention must be directed to the peculiar diathesis, on which the disease is dependent.

* Bartholin. Act. Hafn. iv. Obs. 46. † Schwencke, in Verhandlingen van Haarlem. viii. ii. p. 203.—Percival, Philos. Essays, i. p. 272.

‡ Eph. Nat. Cur. passim. § Beausnier de la Bonchardiere, Journ. de Med. xlv. p. 267. || Tulpus, Lib. ii. c. 15.—Fabric. Hildanus, Cent. i. Obs. 46. Cent. vi. Obs. 22. ¶ Hildan. ex Pigray. Ep. 51. ** Diemerbroeck, Anat. Lib. iii. cap. 13.—Rammazzini, &c. Morb. Artificum, cap. 26.

In the former case small doses of the milder mercurial preparations, combined with the usual narcotics of the lurid and umbellate orders, as conium *Oenanthe* (dropwort) *hyoscyamus*, and *solanum*, may afford local relief by their narcotic and alterative power: while the general state of the system should be subjected to the regulations, which will be found laid down under the diseases *STRUMA* and *MARASMUS Phthisis*, in the ensuing class.

The deposite of calcareous matter in the substance or air-cells of the lungs, may be the result of a morbid affection confined to the lungs themselves; for we often find them loaded with a deposite of this kind, while all the other viscera are in a state of health; or it may proceed from a calcareous diathesis, of which we shall have to treat more at large under the genus *OSTHESIA*, in Class VI. Order I. of the Nosological Arrangement. In the former case, acid inhalations, or fumigating the chamber with the vapour of tar, which always contains a portion of acid, after the manner proposed under the preceding species, will afford a prospect, not merely of temporary relief by their tendency to dissolve the calcareous deposite, but probably of more permanent benefit by changing the nature of the morbid action.

Where the formation of calcareous matter appears to depend upon an osthetic diathesis, or a constitution prone to generate lime, diluting apozems drunk freely will be serviceable; and particularly a very free beverage of aerated mineral waters; which, while they dilute, will tend to invigorate the system generally, and produce a beneficial change upon the habit. Where calculi are disposed to form in the kidneys or bladder, Dr. Russell has recommended a very liberal use of sea-water; De Haen of lime-water, of which he tells us, that, in one case, not less than fifteen hundred pints were drunk with very essential advantage. Many foreign physicians advise the continental mineral springs, as those of Pymont, Carolina, and Bareges: while other pathologists have found large quantities of pure water, hot or cold, prove as good a palliative or remedy: in all which we trace out one common principle, which is that of dilution, and we can trace out nothing else. A warm climate, which proves a perpetual diaphoretic, and urges perpetually to the surface, will also in all probability be found serviceable; and, above all things, pure air and as brisk exercise as the patient can bear without fatigue, so as to strengthen the system, and at the same time keep the skin soft and moist.

Mechanics engaged in working on metals, glass, freestone, or any other material, minute particles of which are apt to fly about and impregnate the atmosphere, and pass by inhalation into the lungs, should be peculiarly careful to keep their mouths and nostrils covered with a handkerchief. And if the lungs be irritated with sharp spiculæ, and a distressing and chronic cough be excited, all similar labour must be abstained from; the diet be peculiarly light; emetics be frequently administered; and, in the interval, diluting apozems to be used copiously, with bland demulcents. And if, by these means, we can check the irritation for some weeks or months, the lungs will often,

GEN. I.
SPEC. II.
Bex sicca.
Treatment.

Calcareous
deposite.

Acid inhal-
ations.

Osthetic
diathesis.
Treatment.
Diluents
drunk
freely.

Sea-water
drunk
freely.
Lime-
water.

Simple hot
water.

A warm
climate.

Brisk ex-
ercise.

Acrid par-
ticles in-
haled by
mechanics:
hence cau-
tion neces-
sary in their
respective
callings.
Emetics.

Lungs less
affected
from habit.

GEN. I.
SPEC. II.
Bex sicca.
Treatment.

by a growing habit of exposure to its cause, cease to be materially affected by it; and the patient may pass through life without much inconvenience. But if hereby we should not be able to succeed, inflammation, hemorrhage, or phthisis, will probably be the result.

[Though various morbid affections of the lungs are imputed by Dr. Good, with many ancient and modern pathologists, to the inhalation of dust and other extraneous particles by several descriptions of workmen in their different employments, the correctness of the doctrine is denied by Professor Laennec,* whose arguments, however, turn chiefly on the escape of some individuals from the mischief, though exposed to the suspected cause, and on the fact of dust taken into the lungs being expectorated afterwards with the mucous secretion of the bronchiæ. Both these circumstances are true, and yet the temporary or partial lodgment of the extraneous matter may give rise in many instances to pulmonary disease.]

Expecto-
rants and
demulcents.

In this variety, we have also great reason to expect benefit from the use of mild expectorants and demulcents.

Of the nature and operation of expectorants I have spoken already: and as there is no complaint, in which demulcents can be employed to more advantage, and few in which they will prove so pleasant and tranquillizing, let us digress for one moment to examine into their nature and operation.

Nature of
demulcents.

Demulcents are medicines that obtund the action of acrid or spicular materials, not by changing their acrimony, but by covering them with a viscid and inirritant fluid. They are of two sorts, mucilaginous and oily; and of the manner in which they act, when applied to the surface of the body, there is no doubt whatever. But by what means they are able to retain their inviscating power, when passing through the stomach to a remote organ, is far less clear, and has been a source of considerable controversy. Where the irritation is in the lungs, as in the case before us, it has been supposed by many writers, and especially by Dr. Cullen, that by swallowing these substances leisurely, as we necessarily besmear the fauces and upper part of the glottis, we directly take off all irritation from these organs; and that the quietism hereby produced in the upper extremity of the trachea, is propagated by sympathy through the whole of the bronchial ramifications and the air-cells of the lungs; and that it is in this manner demulcents prove remedial in all pulmonary irritations.

Their effect
two-fold.

By what
means they
act.

Hypothesis
of Cullen.

Unsatisfac-
tory:

But this is no explanation of their obtunding power in remote quarters, as for instance in the kidneys and bladder, where these organs have been stimulated by a blistering plaster: and as Dr. Cullen is not willing to allow of a specific power in medicines of any kind, nothing has remained to him but to cut the Gordian knot abruptly; and to contend that "the operation of demulcents in covering acrimony in the mass of blood, must be very inconsiderable."[†]

* On Diseases of the Chest, &c. ed. 2, p. 137, transl. by Dr. Forbes.

† Mat. Med. Part ii. cap. xii. p. 412.

But this is to uphold an hypothesis by an assertion, opposed to the experienced train of events, and to which he himself submits on other occasions ; for Dr. Cullen has no hesitation in recommending the use of demulcents, when we follow him into his practice, almost as freely as any other physician whatever. I pretend not to determine whether they act in every instance when employed internally by their sensible quality of viscosity, or by some insensible specific power ; but that, by some means or other, they are capable of allaying irritation in organs remote from the stomach, is a fact so generally known, that it would be a waste of words to bring examples of it. And notwithstanding the difficulty of conceiving how a few drachms of bland oil, or a few ounces of gum arabic, can be intermixed with many pounds of serosity, and still retain their sensible quality of inviscating sedatives, it is by no means more difficult to conceive this, than that moderate doses of sulphuric acid, introduced into the stomach, should pass copiously by the skin in its acid state, as Dr. Cullen allows it to do, and cure the itch ; or that the muriate of soda, employed as an ingredient in the manufacture of glass, should, in the melting of this material, impregnate the atmosphere of the glass-house, be inhaled by the lungs of the workmen, and, passing with the matter of perspiration through the pores of the skin, once more concrete in crystals on their foreheads.

As several of the vegetable oils are obtained from narcotic plants, it is well worth enquiring, though a different question, whether, in any of these, there is a combination of any portion of the narcotic principle ; as such oils would in many cases possess a high advantage over the rest. The oils of this description which have been most tried, are those obtained from the seeds of the *lactuca virosa*, and the *papaver somniferum* : and both these kinds of seeds, while they make pleasant emulsions, are said, by many writers, to communicate a slight degree of narcotic power at the same time ; an assertion, however, which Dr. Cullen does not give credit to, and which seems to be disproved by repeated trains of experiments in France, and especially by those of the society of agriculture in 1773, with respect to the former. But as I have not tried them sufficiently to speak with decision on the subject, I merely throw out the hint, that it may be followed up by others, and extended to plants not yet examined for this purpose. The seeds of both plants give forth oil pretty freely : those of the poppy often in the proportion of six or seven ounces of the oil to every two pounds of the seeds.

In hot weather, sultry climates, or long voyages where rancidity may be apprehended, the best, as well as the pleasantest of all the vegetable oils, is the expressed oil of the cocoa nut, commonly known by the name of BUTTER OF CHOCOLATE. It is of a brownish hue when first obtained, but may be whitened by ablution in hot water, and still more so by an alkaline ley, quicklime, or spirit of wine. It will keep for years without becoming rancid, and may even be left for a month in a copper vessel without undergoing this change.

GEN. I.
SPEC. II.
Bex sicca.
Treatment.
and opposed
to experi-
ence.
Whether
they act by
their visco-
sity or by a
specific
power, not
known.

Expressed
oils of nar-
cotic plants.

Butter of
chocolate.

GEN. I. Of the vegetable mucilages, the best fitted for keeping is
 SPEC. II. that obtained from the Iceland moss. If infused in water be-
 Bex sicca. fore it is boiled, it will lose much of its rough bitterness and
 Treatment. colouring material, and its taste will be pleasant. Its viscosity
 Mucilage of is more than double that of gum arabic; and emulsions, thus
 Iceland formed, have been kept fourteen weeks without the slightest
 moss. marks of putrescency.

SPECIES III. Bex Convulsiva.—*Hooping Cough.*
Kin-Cough.

*The cough convulsive and suffocative; accompanied with a shrill re-
 iterated hoop; and frequently with vomiting; contagious.*

Greek
name.
Latin name
pertussis.

THE Greeks denominated this disease BEX *theriodes* (*ἑρπιδις*), which the Latins translated literally *Tussis ferina*, "wild or untameable cough," from its violence. The name of *Pertussis*, by which it has often been called in later times, is of doubtful origin and meaning; and I have hence followed M. de Sauvages, and exchanged it for *Tussis convulsiva*, the specific epithet being far more expressive than that of the Greek writers. Our own name of Hooping-cough is evidently derived from the convulsive clangor which accompanies the fit. The name of *Kin-cough*, by which it is distinguished in the north, and which should rather be written *Kind cough*, is derived from the Saxon or German term *kind*, "a child," as being peculiarly common to this age. This cough is contagious, though not in a very high degree; whence Stoll and other writers have fallen into the error of asserting, that it is not so at all.* [Even Laennec† deems the contagious nature of hooping-cough not satisfactorily proved, and regards alternation of temperature quite as much a cause of this, as of other catarrhs.]

Kin-cough,
meaning of.

Remote
causes nu-
merous.

The remote cause of hooping-cough it is often difficult to trace. Frequently, indeed, like common or humid cough, it seems to proceed from cold, from some irritability of the stomach,‡ or some peculiar affection of the lungs.§ I have already observed, that the dry cough (*tussis sicca*) has occasionally been produced by larvæ of insects, whose minute eggs, being inhaled with the air of respiration, have found a convenient nidus in the bronchial vessels; and hence Linnæus, who at one period of his life endeavoured to resolve almost all diseases whatever into an animalcular or insect origin, taught that the hooping-cough was also produced in the same way by an insect of a peculiar kind.|| This opinion has not been adopted beyond the precincts of the Linnæan school. But we are, nevertheless, very considerably in the dark upon the subject; for there are numerous cases of the disease occurring daily, in

By Linnæus
supposed to
be produced
by animal-
cules.

* Nat. Med. P. ii. p. 184.
by Dr. Forbes, ed. 2. p. 96.

† On the Diseases of the Chest, &c. transl.

‡ Allgem. Deutsche Bibl. lvii. p. 434.

§ Stoll, Prælect, p. 289.
v. 82.

|| Diss. Exanth. viva. Vide Amœn. Acad. vol.

which it originates from a source that eludes our research altogether. It is most common to children, though sometimes to be met with in adults; is often epidemic, but rarely, if ever, attacks more than once in a man's life. And from all these circumstances, it may be inferred, that it proceeds, in most instances, from a miasm of a specific nature and peculiar quality; which, like those of the influenza or epidemic catarrh, and the measles, has a direct determination to the lungs; though it is not, like these contagions, essentially linked with fever.

GEN. I.
SPEC. III.
Bex con-
vulsiva.

Mostly
from a pecu-
liar miasm.

The excretion is at first small in quantity, but afterwards more copious, though always viscid. The hoop, or sonorous spasm, is often accompanied with a rejection of the contents of the stomach; and the whole system during the paroxysm suffers great violence. The face is turgid and purple from suffusion, and the eye-balls swollen and prominent. The little patient, with a forewarning of the attack, falls on his knees at the time, or clings closely to any thing near him. Yet the violence is instantly forgotten; and, after deeply panting for breath, he returns with as much eagerness as ever to his play, or other pursuit: while the vomiting, which is commonly a good sign, is succeeded by a craving for fresh food. [In the words of Laennec, a colourless, and scarcely frothy, but ropy phlegm rather flows, than is rejected from the mouth, after each paroxysm, while the patient leans forward to favour its escape. The paroxysms at first recur several times every day, being almost always most severe towards the evening, but less violent in the night. After a certain time, they return only in the morning and evening, and, towards the end of the disease, in the evening only. Before it terminates, the paroxysms are shorter, lose their peculiar characters, and are attended with an expectation more decidedly mucous. Sometimes the disease degenerates into a chronic mucous catarrh, with emaciation, and other symptoms resembling those of consumption. In the interval of the paroxysms, the patient coughs but little, and, though Drs. Cullen and Watt represent some slight febrile disposition as being mostly observable at certain periods of the day, Laennec states, that the patient rarely has any fever, except in the case just now mentioned, or at the beginning of a very severe attack.*] The disease lasts irregularly from three weeks to as many months.

Description.

[According to Professor Laennec, each fit is composed of a quick succession of sonorous coughs, with scarcely any perceptible intervening inspirations, except that, from time to time, the expirations of coughing are suddenly interrupted by a very deep, seemingly convulsive, and noisy inspiration, accompanied by a lengthened hissing, that constitutes the pathognomonic sign of the disease. Laennec represents the peculiar sonorous inspiration as seated exclusively in the larynx and trachea. He

Seat of the
sonorous in-
spiration.

* See Laennec on Diseases of the Chest, &c. transl. by Forbes, p. 96, ed. 2. 8vo. Lond. 1827.

GEN. I.
SPEC. III.
Bex con-
vulsiva.

also considered the spasmodic character of the whooping-cough as sufficiently proved by certain phenomena, which occasionally show themselves in the glottis, larynx, and even in the pendulous veil of the palate. The extraordinary noises, made by certain patients in breathing, or coughing, he imputes to a spasmodic or voluntary contraction of these parts. The same, he says, is true of the peculiar sounds which attend the whooping-cough. He has seen patients, who crowed like a cock, or barked like a dog. Dr. Bally sent him a patient with whooping-cough, in whom the paroxysms were accompanied with a cooing, like that of a wood-pigeon. Laennec was convinced by observation and the aid of the stethoscope, that the sound arose from a spasmodic contraction of the veil of the palate and sides of the glottis. The opinion was farther confirmed by the suspension of the sound by an accidental inflammation of the throat, and its renewal, in a less degree, on the subsidence of the latter complaint.*]

Symptoms
mitigated
by a free
discharge of
mucus.

Seat placed
by Butter
in the ali-
mentary
canal.

Why dan-
gerous in
infants.

In adults.

Prognosis.

Identified
by Marcus
with croup.

The whooping-cough, when in the height of its career, is usually accompanied with a very copious secretion of mucus, a free discharge of which mitigates the general symptoms. From this circumstance Dr. Butter concludes, and with great correctness, that a morbid irritability of the mucous glands is the primary affection, to which the spasms are only secondary.† It is somewhat singular, that, with this view of the disease, he should place its seat, not in the larynx, or any part of the trachea, but in the alimentary canal. In infants, it is mostly alarming from its tendency to produce convulsions, suffocation, apoplexy, inflammation of the brain, ruptures, and incurvation of the spine. [The younger the subject, the more dangerous the disorder; and a large majority of those who die from its attacks are observed to be under two years of age. Children, born of phthisical asthmatic patients, are most liable to suffer from the violence of the disease.] In adults, it excites pneumonitis more frequently than in children; and, in pregnant women, has often led to abortion. A moist skin, warm extremities, open bowels, plentiful expectoration, and free vomiting, are favourable symptoms. Frequent hemorrhage protracts the disease; and if it proceed from the lungs, a foundation will often be laid for phthisis. The violence of the action occasionally excites inflammation in the trachea. Dr. Marcus, among other singular opinions that distinguished his career, brought himself at last to believe, that such inflammation was always present: and having advanced thus far, he next undertook to show, that whooping-cough and croup are one and the same disease. He died, indeed, while dictating the preface to his treatise on the former affection, which he hoped would establish this opinion. Dr. Dawson has since revived a part of this hypothesis, by conceiving that whooping-cough is a specific inflammation, seated in the glottis, or upper part of the trachea, and spreading more

* Op. cit. ed. 2. p. 96--98. † Treatise on the Kin-cough, with an Appendix, &c. 8vo.

or less widely, according to the degree of its violence : but he does not identify it with croup.* Straack maintains, that the material cause of the disease (*causam materialem ejus*) is seated in the *glands* of the fauces and glottis.

GEN. I.
SPEC. III.
Bex convulsiva.

[Dr. Watt inculcated the opinion, that hooping-cough is essentially an inflammation of the mucous membrane of the bronchia, which statement agrees with Laennec's description; and, if correct (which the editor thinks unquestionable), the complaint should properly be regarded, with Laennec, as a species of catarrh, and classed accordingly. Dr. Watt clearly proves that the disease, when fatal, generally becomes so from severe bronchitis. In several instances, in which the state of the lungs was ascertained by dissection after death, the most remarkable appearances were an inflamed condition of the trachea and bronchiæ, particularly of the latter, and an almost complete obstruction of the bronchial passages with a serous or mucous fluid, interspersed with flakes of semipurulent matter.† These effects may be supposed to be only the consequence of the violent cough; but, as Dr. Forbes has remarked, the opinion, delivered on the seat of the complaint by Dr. Watt, is amply confirmed by the early symptoms, and the indications of the stethoscope.‡]

In a few rare instances, hooping-cough assumes a periodic character, and is then sure to become peculiarly intractable. Dr. Perceval, in his Comments on the Nosology, has favoured me with a singular case of this kind, which occurred daily at a certain hour, attended with a tremor of the whole body: the fit terminating by a shriek, rather than a hoop. The complaint was obstinate for several months, and returned at the same season for two years. It yielded to no medicine, and was supposed to depend on some morbid condition of the liver.

Periodic
hooping-
cough.

In treating the disease, our attention ought, in the first place, to be directed to an expulsion of the morbid matter or miasm, which produces it, if we were better acquainted with its nature, and had a direct specific for this purpose. But as we are not thus fortunate, and perhaps never shall be, we must pursue another plan.

Medical
treatment.

Dr. Cullen, in laying down his own mode of treatment, indulges in an ingenious, and I believe correct, hypothesis, and divides the disease into two stages. The first consists of that part of it, during which he supposes the contagion to be present and operative, which possibly may include the first three weeks; the second embraces the remainder of its duration. Throughout the former stage, our attention should be directed to whatever will moderate the influence of the contagious stimulus, retard the return of the convulsive paroxysms, and mitigate their violence. [If the patient can be made to drink by small and repeated portions during the paroxysm, its severity and

Attention
to it under
two stages,
as recom-
mended by
Cullen.

Process
under the
first stage.

* Nosological Practice of Physic, 8vo. 1824.

† Treatise on Chincough, &c. p. 123, 8vo. 1813.

‡ Note in transl. of Laennec on Diseases of the Chest, &c. p. 98. ed. 2.

GEN. I.
SPEC. III.

Bex con-
vulsiva.
Bleeding
how far
proper.

Emetics
why useful.

From
purging no
benefit.

Process
under the
second
stage.

Sedatives.

Opium and
conium.

duration, according to Laennec,* will be diminished; perhaps from the effort of deglutition facilitating deeper inspirations, by counteracting the spasm of the bronchiæ.] Bleeding, in severe cases, will usually be found necessary for this purpose; but, it should be avoided, under other circumstances, as spasmodic affections are often rather increased than diminished by the use of the lancet; and it will generally be found better to employ blisters as a substitute. The most effectual remedy is emetics; whose action tends equally to interrupt the return of the paroxysms, and to keep the lungs unloaded, by producing a determination towards the surface. [Laennec recommends them to be repeated every day, or every second day, for a week or a fortnight; and prefers tartarized antimony to ipecacuan, on account of the great inequality of power in the latter, and the solubility of the former allowing it to be more easily administered in doses proportioned to the exigency of the case.] The food must be light, and costiveness carefully prevented; but no benefit seems to be derived from purging.

In this manner, upon Dr. Cullen's mode of treatment, we are to guide the patient through that part of the disease which we may suppose to be kept up by the stimulus of contagion. In its latter part, or second stage, in which a morbid habit alone is, in all probability, the irritative power, a different course is demanded. For we have now nothing more to do, than to oppose the spasmodic habit by an antispasmodic process. A sudden and violent emotion of the mind, as overwhelming terror, is well known to have had this effect. But such a remedy is not to be recommended; and hence different tribes of medicines have been resorted to, which may be arranged under the three divisions—of SEDATIVES, for the purpose of taking off the morbid irritability of the affected muscles; STIMULANTS, for the purpose of local or general revulsion; and TONICS, for that of both local and general re-invigoration.

The sedatives, chiefly recommended, have been opium, hyoscyamus, belladonna, conium, *ledum palustre*, the moschate antispasmodics, and lead.

Of the first four, a general preference has been given to the conium; for though opium has the authority of many distinguished practitioners,† it has often been found of no avail, even where it has been given in large and frequent doses; and, still more generally, has been productive of greater mischief than good. Hence the conium has acquired a far higher degree of public favour, for which it is much indebted to the writings of Dr. Butter, who represents it as having the double virtue of retarding the returns of the convulsive paroxysms, and of mitigating their violence; and, on this account, he prescribed it through every stage of the disease, and however complicated with other affections. He employed it, moreover, in every

* Op. cit. p. 98.

† Laennec on Diseases of the Chest, &c. p. 99. ed. 2. by Forbes. ‡ Hufeland, N. Annalen, i. p. 367. Demachy, Manuel de Pharmacie. Paris, 1788.—Rüling, Beobachtung der Stat. Northeim, p. 107.

form, whether of powder, extract, plaster, or cataplasm; but, for internal use, he gave the powder, allotting a grain a-day to infants under six months, and ten grains to adults, with a gradual increase as they persevered. [After emetics, Professor Laennec also prescribes narcotics in small doses, and considers the extract and powder of belladonna as the best medicine of this class. The dose is from $\frac{1}{8}$ to $\frac{1}{2}$ of a grain. Its efficacy in lessening the severity of the cough, and shortening the duration of the disease, he conceives, may be accounted for by its lessening the necessity of respiration, and consequently the dyspnoea; obviating the spasm of the bronchiæ; diminishing the irritation produced by the vascular congestion of the mucous membrane; and lessening the augmented secretion.*]

GEN. I.
SPEC. III.
Bex convulsiva.

Belladonna.

The *ledum palustre*, or marsh cistus, as a sedative in whooping-cough, stands chiefly on the authority of Linnæus:† it has not been introduced into the practice of our own country.

Ledum palustre.

Musk has been tried both abroad and at home, from six grains to half a drachm at a time; but its effects are so various, and indeed contradictory in different individuals, as to prevent confidence in its use. The artificial musk, a spongy mass, obtained by mixing nitrous acid with oil of amber, appears to have been as successful as the most genuine from Thibet; and is hence well entitled to attention from its comparative cheapness.

Musk and artificial musk.

The boldest sedative practice has been the internal employment of lead. It was first recommended, so far as I know, by Dr. Forbes of Edinburgh,‡ who used the liquor subacetatis, or Goulard's well-known extract, and speaks highly of its success, but it has never acquired any standard reputation.

Lead.

The stimulant plan, if it have not been more successful than the sedative, has at least been as powerfully supported. Its intention I have already stated to be that of taking off the propensity to spasmodic action in the trachea, by exciting a general or remote local revulsion. And the medicines, chiefly employed for this purpose, have been cantharides, ammonia, ether, camphor, the herb Paris, and rhus Vernix.

Stimulants.

[Laennec has seldom found blisters of much use:§ instead of them, Autenrieth has proposed the application of tartar emetic ointment to the chest, a plan, from which the above professor has seen more benefit result than from blisters.]

Cantharides.

Blisters and antimonial ointment.

When blisters were formerly employed with great freedom in the whooping-cough, it was thought to be ascertained, that they always answered best when they irritated the bladder and occasioned strangury. And, on this account, some practitioners have endeavoured to produce the latter effect without the pain of the former, and have for this purpose employed cantharides in tincture, in the proportion of twenty minims to a dose.|| Dr. Barton of York first joined it with bark and the compound tincture of camphor, a practice afterwards adopted by Dr. Lettsom,

* Laennec, op. cit. p. 99.
viii. p. 156.

† Diss. Led. Palustr. in Amœnit. Acad.
‡ De Tussi Convulsiva. Edin. 1743.

§ On Diseases
of the Chest, &c. p. 99. ed. 2.

|| Forbes, loc. citat.

GEN. I.
SPEC. III.

Bex con-
vulsiva.
Stimulant
embroca-
tions.

Hufeland, and others. But whether given alone or in combination, I have never found any decided benefit from its use.

Where the intention is to divert the tendency to convulsive action by local revellents, it is far better to employ them externally, and particularly on the chest, and down the chain of the spine. The most common stimulants for this purpose are garlic, camphor, ammonia, ether, and the essential oils of amber and turpentine, which, in different combinations, have been long used, and still preserve their reputation.

Whence
beneficial.

I have reason to believe, that embrocations of this kind have often proved highly beneficial; and it is not difficult to account for such an effect: since the cervical and dorsal nerves are so generally distributed over the muscles of the chest, the diaphragm, and the scapulæ; and some of them, as the accessory nerves of Willis, form an integral part of the par vagum, and assist in giving rise to the cardiac and pulmonic plexus.

Universal
revellents.

Many stimulants have also been occasionally employed internally for the purpose of producing an excitement generally, and thus of acting as universal revellents, as camphor, ammonia, and the sulphuric and nitric ethers. These have often been found useful, and, where narcotics are given, they rather assist, than oppose their good effect.

Lobelia
inflata.

[Dr. Andrews* has prescribed the tincture of lobelia inflata with striking success. He says, that there is no other medicine that so effectually frees the bronchial vessels of their viscid secretion. It is emetic and antispasmodic. The dose, generally given by him, was thirty or forty minims every twenty minutes.]

Rhus
vernix.

The *rhus vernix* comes also strongly recommended by many foreign writers of distinguished character, as a stimulant spasmodic of considerable power, and highly useful in the whooping-cough. Dr. Fresnoi, to whom we are chiefly indebted for our acquaintance with it, employed its leaves in the form of an extract. Of this he dissolved four grains in four ounces of syrup, and gave a table-spoonful every three hours to a child.

Assafoetida.

[By Dr. Millar, a high opinion was entertained of assafoetida, as a remedy for whooping-cough, as well as asthma; but it does not at present retain this character.]

Tonic medicines and regimen.
Cinchona.

After all, perhaps the best antispasmodics are tonic medicines, and a tonic regimen. Dr. Cullen trusts almost exclusively to the cinchona: "I consider," says he, "the use of this medicine as the most certain means of curing the disease in its second stage; and when there has been little fever present, and a sufficient quantity of the bark has been given, it has seldom failed of soon putting an end to the disease."

The best and most convenient form of the bark for children is the sulphate of quinine. [It is observed by Laennec,† that, when the paroxysms of whooping-cough assume a periodical type, cinchona, and the sulphate of quinine, are as efficacious

* See Glasgow Med. Journ. vol. i. p. 178.

† On Diseases of the Chest, &c. p. 99. ed. 2.

as in cases of ague.] When the sulphate of quinine disagrees, as it will sometimes do, I have employed the mineral tonics, as the oxyde of zinc, from half a grain to a grain, two or three times a-day; or the nitrate of silver, from the twelfth to the eighth part of a grain, repeated in the same manner.

GEN. I.
SPEC. III.
Bex convulsiva.
Minerals.

The former has, I believe, fallen into a very undeserved degree of disfavour in the present day, and chiefly from its having formerly been extolled for qualities which it by no means possesses. Dr. Gaubius, who was a man of sound judgment, was peculiarly attached to it; not only in the present disease, but in all clonic irregularities of the muscles. Of the solution of arsenic I cannot speak from my own knowledge. It has, however, been tried by several respectable practitioners of late, and is said to have proved highly serviceable.

Arsenic.

Yet the prussic or hydro-cyanic acid has a still fairer claim to trial, and has unquestionably subdued the spasmodic irritation, and consequently relieved the cough in a variety of instances. It is here indeed, and in nervous cough, that it seems to act with most advantage.* I have known it succeed when there was the utmost degree of danger from general convulsions; the dose for a child of four years old being from a drop to a drop and a half, or even two drops of Scheele's preparation of the acid, every four hours, till a decided impression is produced.

Prussic acid.

As an important part of our tonic plan, may be mentioned change of air, and especially where the difference of temperament, or even temperature, can be rendered very considerable, as from a low to a high atmosphere, or from the interior of a country to the sea-coast; but cold bathing, so far as my own experience extends, has proved more certainly and rapidly remedial, than any other prescription whatever; and particularly where it has never been made use of before, and hence introduces a new action into the system.

Change of air.

Cold bathing.

[The extract of common daffodil (*narcissus pseudo-narcissus*), and the infusion of its petals, were proposed, a few years ago, as a specific against this disease. Laennec† has given the extract an extensive trial, and seen it effect surprisingly rapid cures; but this result is rare, and he finds it much less efficacious, than belladonna. The dose is half a grain, a grain, or two grains, every two, four, or six hours, according to the patient's strength. Its mode of action is imperfectly known.]

Narcissus pseudo-narcissus.

M. Laennec has occasionally applied his stethoscope to this disease, and thinks he has in some instances obtained a measure of its violence and extent, as he has also done in chronic catarrh. To effect such a result, however, there must be some increase of cavity in the vessels or organs of the thorax, beyond that of ordinary health; and M. Laennec conceives this occurs in both instances: in hooping-cough from a dilatation of

* *Recherches Physiologiques et Cliniques sur l'Emploi de l'Acide Prussique, &c. par N. Magendie, D.M. Paris, 1819.*

† *On Diseases of the Chest, &c. p. 99. ed. 2. transl^d by Forbes.*

GEN. I.
SPEC. III.
Bex con-
vulsiva.

the bronchiæ occasioned by weakness, brought on by excess of straining; and in chronic cough, from a debility in all the vessels, both bronchial and sanguiferous. The nature of the stethoscope, and its mode of application, we shall describe when treating of phthisis.*

GENUS II. LARYNGISMUS.—LARYNGIC SUFFOCATION.

Sense of spasmodic suffocation in the larynx, commencing suddenly, and relaxing, or intermitting; cough troublesome; scanty discharge of viscid mucus.

Often con-
founded
with croup
and called
spasmodic
croup.

THERE is a disease that often attacks the larynx, and especially of infants and children, which has so near a resemblance to croup, as to be very generally confounded with it, and which is hence commonly known by the name of *spasmodic croup*: but which, notwithstanding the resemblance of many of its symptoms, is essentially different from it, and ought to be arranged in a different place. It is for this purpose the present genus has been formed, and the present name invented, with a termination that sufficiently distinguishes it from laryngitis, or *inflammation* of the larynx, yet a termination that has the sanction of the best medical writers in every age.† The distinctive characters of bronchlemmitis or croup are, inflammation of the mucous membrane of the trachea and bronchial vessels, and the secretion of a peculiar concrete and membrane-like material that lines the tracheal tubes, and threatens suffocation by obstructing them. In the disease before us, we have neither inflammation nor membrane-like secretion; while the sense of suffocation is produced, not by obstruction, but by spasm. The only known species belonging to this genus is the following.

Distinction
between the
two.

SPECIES. Laryngismus Stridulus.—*Stridulous constriction of the Larynx.*

Commencing usually in the night; voice shrill and croaking; countenance flushed and swollen; distressing struggle for breath.

Sometimes
confounded
with
asthma:

THIS species forms the spasmodic asthma of Millar, Parr, and various other writers. Yet it is not strictly an asthma, though it makes an approach to it; and the name, under which it has been thus described, shows sufficiently, that the present is the proper place for its reception. In asthma, the constriction begins in the chest, and chiefly exerts itself there, though the spasm may extend to the upper part of the trachea. In spasmodic laryngismus the constriction commences in the larynx,

* Vol. iii. Cl. III. Ord. IV. Gen. III. Spec. IV.

† See Prelim. Diss. to the Author's System of Nosology.

and is chiefly confined to that organ, though it may extend to the chest. In the former, the respiration is wheezy, but the voice is not stridulous; in the latter, the voice is stridulous, but the respiration is rarely wheezy, or seldom so in an equal degree; evidently showing a difference in the seat of the two diseases. And hence I have found it necessary to separate it from asthma, and arrange it under a different head.

GEN. I.
SPEC.
Laryngismus stridulus.

As already observed, the general symptoms make a nearer approach to croup: "The inconvenience," observes Dr. Parr, "is the greater, since, from the resemblance of the symptoms, remedies have been celebrated as successful in croup which were never used in the disease; and the less experienced practitioner, trusting to them, has felt the severest disappointment."

yet more nearly resembles croup.

The suddenness, with which this complaint commences its attack, forms another mark of distinction between itself and croup, almost as pathognomic as the absence of inflammation, and the peculiar secretion in the latter. There are instances, indeed, in which genuine croup has also commenced abruptly, but these are very rare; for it has usually the precursive symptoms of a slight cough and hoarseness for a day, and sometimes two days, as though the patient were labouring under a catarrh. In croup, also, the inflammation, when it has once taken effect, becomes a permanent cause of excitement, and the anxiety and struggle for breath continue, with little if any abatement, till the inflammation is subdued. In the disease before us, the spasm suddenly subsides in a short time, though it may perhaps return in an hour, or half an hour, or even a few minutes; and, in the interval, the patient enjoys perfect ease, though the voice is rendered hoarse from the previous straining. Croup is, moreover, an exclusive disease of children; stridulous spasm of the larynx is sometimes found in adults. Those who have been dissatisfied with the name of spasmodic asthma, have, however, treated of it under the name of spasmodic croup, but merely because they have not known how else to distinguish it; for almost every one, who has thus noticed it, has acknowledged, that it is a different disease, and demands a different plan of cure.

Diagnos-
tics: con-
taining
other marks
of distinc-
tion between
the present
species and
croup.

The exciting causes are not always clear: cold and teething are the most common. It appears most frequently in relaxed and irritable habits, where, in truth, we should soonest expect a display of spasmodic action. As there is mostly some degree of cough, and always a secretion of a small portion of viscid mucus, and a croaking voice, there is indeed great reason for supposing some degree of local irritation; and it is on this account that I have preferred entering the disease here, to an arrangement of it under the fourth class, consisting of diseases that are purely and idiopathically nervous. It is possible, however, that some of these symptoms may be the result of the spasmodic struggle itself.

Exciting
cause not
obvious.

An active plan of treatment is imperiously demanded. Yet an antimonial emetic generally effects a cure as soon as it begins to operate, if employed early: but the diaphoresis, which

Treatment.

GEN. I.
SPEC.
Laryngismus stridulus.

it excites, should be maintained for some hours, by keeping the child in bed, and the use of diluents; which will be the most effectual means of preventing a return of the spasm. The bowels should also be excited by a purgative of calomel. And if the emetic do not prove sufficient, or the stricture should be renewed, laudanum should be exhibited according to the age of the patient, and a blister be applied to the throat. But bleeding, which is indispensable in croup, should here be avoided, as it will only add to the irritability. Those, who regard this affection as an asthma, have strongly recommended the fetid antispasmodics, as assafoetida, both by the mouth and injections; but I have not found them successful.

Generally speaking, after the action of the emetic, the child falls into a deep and quiet sleep, and awakes with few remains of the complaint. Yet, if the spasm be not attacked at once, suffocation may soon follow. Those who have once laboured under it, are more susceptible of it than before; and the younger branches of some families seem much more predisposed to it, than those of others.

Since the second edition of the present work, this disease has been noticed by M. Bretonneau of Tours, and described under the name of *angina stridula*. It was mistaken occasionally for a peculiar form of *angina maligna*, which was then prevailing as a contagious disease, and in which the local inflammation, instead of producing ulceration, threw off membranous or croupy exfoliations, and was accompanied with a croupy suffocation. But, in the case before us, there was no swelling of the lymphatic glands at the angle of the jaws; the tonsils and velum palati were free from redness or tumefaction, and no pain was complained of in the region of the larynx. While the attendants were about to apply leeches, and exhibit an emetic, the little patient fell into a refreshing sleep; a gentle moisture appeared on the skin, the cough became looser and little troublesome; and next morning the complaint was nothing more than a common cold, which required no farther medical aid. M. Bretonneau regards this affection as only a simple œdematous tumefaction (*une simple tuméfaction œdémateuse*) of the mucous folds in the ventricles of the larynx.*]

GENUS III. DYSPNŒA.—ANHELATION.

Permanent difficulty of breathing; with a sense of weight in the chest.

THERE has been no small perplexity felt by nosologists in arranging the various diseases, which are chiefly characterized by irksome or distressful breathing. The lungs, like the stomach, maintain a close connexion with most of the functions of the body and the organs which are instrumental to them; while

* Des Inflammations spéciales du Tissu Muqueux, &c. Par P. Bretonneau, Médecin en chef de l'Hôpital de Tours, 8vo. Paris, 1826.

the complaints affecting respiration, that originate in the chest, run so frequently into each other, as to require the utmost nicety in drawing the line between what ought to be regarded as genera and what as species. There are three thoracic disorders that are peculiarly obnoxious to this remark; I mean those, which among recent writers have been described under the names of dyspnœa, orthopnœa, and asthma. Celsus, following the Greek physicians, regards them as only modifications of the same malady, merely differing from each other in degree.

GEN. III.
Dyspnœa.

How re-
garded by
Celsus.

"Each," says he, "consists in difficulty of breathing. When this difficulty is moderate and unsuffocative, it is called dyspnœa; when it is more vehement, so that the breathing is sonorous and wheezing, it constitutes asthma; and when it can only take place in an erect position, it is denominated orthopnœa. The first is usually a chronic affection, the latter two acute."* Galen, on the contrary, treats of these diseases as distinct genera, and discusses them in remote positions.

How by
Galen.

The same diversity of view has occurred in modern times. Sir John Floyer and Dr. Bree have reduced the three divisions of Celsus to two, and have used the term ASTHMA as a generic name under which to arrange them. These two divisions are CONTINUED ASTHMA and CONVULSIVE OR PERIODIC ASTHMA;† the former being the DYSPNŒA of the Greek writers and of Celsus, and the latter uniting their ASTHMA and ORTHOPNŒA. I call these divisions rather than species, because Dr. Bree makes four subdivisions of the latter, derived from their supposed causes, and assigns the name of species to them when thus subdivided: though, if asthma be employed generically, it would perhaps be more consistent with the rules of classification to name the primary ramifications species; and the secondary, sub-species or varieties.

A like
diversity of
view in
modern
times.

Arrange-
ment of
Floyer and
Bree.

Almost all the continental writers make each affection a separate genus, as does Macbride among those of our own country. Cullen makes a genus of dyspnœa, as well as of asthma, but merges orthopnœa in the former; Dr. Parr and Dr. Young take as little notice of orthopnœa, and, with Celsus, reduce dyspnœa and asthma to the rank of species under a genus, which they denominate anhelatio or pneusis, which are a Latin and Greek synonym; the former of which is applied by Sauvages to an entire order.

Continental
writers.

Cullen.
Parr and
Young.

Yet Dr. Cullen himself, in his First Lines, is untrue to his Nomenclology; for having in his earlier work arranged and defined dyspnœa as a distinct genus, in his latter he expresses doubts whether, under almost every modification, it is to be regarded otherwise, than as a vicarious or symptomatic affection. On which account, probably, Dr. Crichton, though for the most part very scrupulous in adopting Dr. Cullen's views, has banished dyspnœa as well as orthopnœa from his catalogue, and has only retained asthma of the whole three. Dr. Wilson Philip seems to make little distinction in the use of the terms asthma and dyspnœa, for

Cullen
untrue to
himself.

Crichton.

* Medicinæ, lib. iv. iv. 2.

† Inquiry into Disordered Respiration; 5th edit. p. 231.

GEN. III.
Dyspnœa.
The difficulty how
resolvable.

his habitual asthma and asthmatic dyspnœa are synonymous for the same disease, and run parallel with the present genus.*

There is, nevertheless, a distinctive character, which, if steadily adhered to, may easily settle the question, and designate the proper place to which each respectively belongs. The difficulty of breathing is sometimes permanent; and sometimes recurrent, with considerable intervals of perfect ease; and where it is permanent, it is occasionally distinguished by sudden and irregular exacerbations. These characters are clear, and cannot well be mistaken; and it is upon these pathognomic marks that the arrangement we are now about to pursue has been founded. Dyspnœa distinguishes the cases of permanent difficulty of breathing; asthma, those of the recurrent; and orthopnœa, the cases of permanent difficulty of breathing with irregular exacerbations. The first two, therefore, form distinct genera; the last is necessarily a peculiar species of dyspnœa, linking it very closely with asthma.

Thus bounded and distinguished, dyspnœa, as a genus, offers us the two following species:

- | | |
|----------------------|--------------------------|
| 1. DYSPNŒA CHRONICA. | SHORT BREATH. |
| 2. ————— EXACERBANS. | EXACERBATING ANHELATION. |

SPECIES I. Dyspnœa Chronica.—*Short Breath.*

The breathing uniformly short and heavy; mostly accompanied with a cough.

THE causes of this complaint exist in the chest locally, or in the habit or constitution generally: they are inbred, or the result of accident; and hence the disease exhibits the following varieties:

- | | |
|--------------------|---|
| α Organica. | From organic deformity, oppression, or accidental injury. |
| β Extranea. | From calcareous or other spicular materials, inhaled while working on stones or metals. |
| γ Vaporosa. | From the mischievous action of metallic or other poisonous exhalations. |
| δ Phlegmatica. | From a phlegmatic or cachectic habit. |
| ι Pinguedinosa. | Accompanied with oppressive fatness. |
| Corpulent dyspnœa. | |
| Pursiness. | |

α D. chronica organica.

When the chest labours under an ORGANIC DEFORMITY, or oppression, or the effects of an accidental injury, its cavity is contracted, and its motive powers are usually enfeebled, or curtailed in their action. This is by far the most frequent variety, under which the disease makes its appearance. In some instances,

* On Indigestion, &c. p. 377. 384, 4th edit. 8vo. Lond. 1824.

the lungs have been found peculiarly small* and shrivelled,† in persons who have died of this complaint. [Laennec says, that they diminish in size only from the effects of external pressure, or in consequence of the growth of accidental productions within their substance, which may be considered as exerting a pressure from within outwards. This opinion he illustrates by a reference to what happens in cases of empyema and tubercles.‡] The lungs are sometimes peculiarly hard, and cartilaginous in the duplicature of the pleura which surrounds them.§ There has been adhesion between the folds of their membrane; or adhesion, sometimes ossification|| between the pleura and the ribs, sufficient to lay a foundation for difficulty of breathing. The lungs have been found loaded with hydatids, which have diminished their elasticity;¶ and sometimes these animalcules have been thrown up by coughing; ** and still more frequently the lungs have been indurated by scirrhus, or oppressed with steatomatous, or other tumours.

GEN. III.
SPEC. I.
Dyspnœa
chronica.
Causes from
rigidity of
structure.

Hydatids.

In Bonet, and other writers, we have also examples of internal oppression, and a diminution of cavity, produced by an excessive magnitude in the substance of the lungs, offering a sort of parabysma of this organ, so as to leave little room, and allow little elasticity for their proper play.†† And still more generally the oppressive cause lies without, and the capacity of the chest is diminished by rickets, or a softness of the bones, (*parostia flexilis*,) or some accidental injury by which the ribs or sternum have lost their proper form, and are become incurvated, and without a power of elevation.

Excessive
magnitude
in the lungs.
Causes
operating
from
without.

In all these cases, the healing art can do little. It may, perhaps, occasionally palliate some of the distress, to which the patient is irrevocably doomed, but it cannot go farther. Perfect tranquillity of body and mind, gentle exercise, a light diet, with a total abstinence from flatulent vegetables and fermented liquors, and an undeviating habit of regular hours, comprise, perhaps, the whole that can be recommended by the physician, or attempted by the patient. [Where dyspnœa depends on the presence of hydatids, or, as Laennec terms them, acephalocysts in the lungs, common salt appears most deserving of trial as a means of cure. Sheep, which feed in salt meadows, are exempt from the rot and staggers, which are occasioned by the development of two species of vesicular worms in the abdominal viscera and brain. If attacked, a removal to such meadows generally cures them. Laennec states, that salt-water baths have appeared to him to benefit patients, afflicted with analogous complaints. It is not necessary, he says, that the hydatids should be expelled to effect a

Treatment
and
regimen.

* Sandifort, Observat. Anat. Pathol. † Bonet, Sepulch. lib. x. sect. i. obs. 45. ‡ On Diseases of the Chest, p. 147, 2d edit. § Schreiber, Nov. Comment. Petropol. III. p. 395. || Schachier, Diss. de Ossificatione Præternaturali, Lips. 1726. ¶ Bonet, Sepulch. lib. II. sect. i. obs. 33. Also, valuable observations on this subject, by Laennec, p. 373, 2d edit. ** Ephem. Nat. Cur. Dec. II. ann. i. obs. 80. †† Sepulch. lib. II. sect. i. obs. 57, 58. Ruysch. obs. 19, 21. Eph. Nat. Cur. Dec. i. ann. i. obs. 6. Id. Dec. II. ann. x. obs. 175; and Laennec on Diseases of the Chest, chap. on Hypertrophy of the Lungs, p. 146, 2d edit.

GEN. III.
SPEC. I.

cure: it suffices if they be deprived of their vitality, after which their liquid is absorbed, the cyst shrinks into a small compass, and, upon cutting into the tumours, we find the hydatids quite flattened, and sometimes stratified with layers of albuminous and friable matter.*]

β D. chronica extranea.

Sawyers and hewers of free-stone or other fossil masses; glass-cutters, china-manufacturers,† lapidaries, and workers upon metals, are often subject to dyspnœa, from having the LUNGS LOADED WITH FINE PULVERULENT PARTICLES, detached from the materials on which they are employed, and floating in the atmosphere that surrounds them. And to these may be added, millers, starch-makers, horn and pearl-workers, needle, edge-tool, and gun-barrel grinders; and, for a like reason, weavers, wool-carders, and feather-dressers. This affection is so nearly similar to the variety β of *dry cough*, on which we have treated already, that it is only necessary to refer the reader to the remarks there laid down. The cause and mode of treatment are the same; and the symptoms chiefly differ from a difference of constitution. Where the lungs are peculiarly irritable, a troublesome cough will ensue from the first, before any considerable quantity of buoyant particles can have entered into the bronchiæ; but where there is little irritability, no cough demanding particular attention has shown itself for years; and the lungs, from a habit of exposure to the same influence, have betrayed no uneasiness till they have gradually been transformed into almost a mine or quarry, of the material worked upon.‡ Various contrivances have been devised for straining off the floating particles from the air inhaled, and thus producing a preventive. Dr. Johnstone, long ago, proposed a muzzle of damp crape for this purpose; Dr. Gosse a sponge; and M. d'Arcet an apparatus which he calls a fourneau d'appel: but for workers in steel or iron, one of the most ingenious is a peculiar kind of magnet that concentrates the metallic spiculæ, and thus prevents them from floating loose in the inspired air. It is an invention of Mr. Abrahams, of Sheffield, and has justly met with the approbation of the Society for the Encouragement of Arts.

Nearly related to
 β Tussis sicca.

Magnetic device.

[The doctrine of diseases of the lungs being produced by the inhalation of dust, and other extraneous particles, was considered by Laennec to be destitute of foundation. The dust, he observes, is quite dissimilar from the cretaceous formation occasionally met with in the lungs. Such productions he correctly regarded as the result of perverted secretion, and he had never met with them, except in dilated branches of the bronchiæ, or in the vicinity of old tuberculous excavations, cured by the formation of a fistula, or cartilaginous cicatrix. The production of cretaceous matter, he says, frequently succeeds that of tubercles.

Dr. Forbes coincides with Laennec respecting the secretion of the chalky matter; but differs from him in believing, with

* See Laennec, on Diseases of the Chest, p. 377, 2d edit. † See Hastings on Inflammation of the Mucous Membrane of the Lungs, p. 273. ‡ Hecquet, Maladies des Artisans, tom. ii.

the author of this work, that the habitual inhalation of dust of various kinds, is a frequent source of bronchial inflammation among various kinds of artisans, and more especially, in this country, needle-grinders, leather-dressers, and miners. An immense proportion of the miners in Cornwall, he says, are destroyed by chronic bronchitis, one cause of which is the inhalation of dust.*]

GEN. III.
SPEC. I.
 β D. chronica extranea.

Exposure to THE VAPOUR OF MINERAL acids, or of metallic or other mischievous exhalations, is also frequently found to produce a permanent difficulty of breathing. This affection is peculiarly common to those wretched beings who are condemned by the laws of their country to work in metallic mines as an expiation of crimes proved against them; a melancholy and interesting picture of whom is given by Didorus Siculus, in his description of the mines of Arabia and Ethiopia. The air-cells of the lungs are often found constricted to half their proper capacity; whilst, in many mines, the vapours are so irritable as to excite a perpetual cough. They are loaded, according to the nature of the mine, with oxydes, sulphurets, or comminuted reguline particles of lead, copper, antimony, silver, arsenic. Metallurgists and the labourers in chemical laboratories are often severe sufferers from a like cause. Gold-refiners become dyspnetic from inhaling the vapour of aquafortis. Etmuller gives an account of his having been seriously injured in his breathing, while carefully superintending an antimonial preparation.† And Heurnius saw the lungs of a printer, so changed by inhaling an atmosphere impregnated with lead, as to resemble a shrivelled apple.

γ D. chronica vaporosa.
Causes.

The treatment of this variety must be regulated by the variety of the cause; but a free inhalation of oxygen gas will be serviceable in perhaps all cases. An inhalation of moderately stimulant vapours, as of an infusion of lavender, marjoram, and indeed most of the verticellate plants, or of diluted wine-vinegar, has also proved frequently of use; to which may be added a current of the electric fluid passed two or three times a-day from the upper part of the spine to the diaphragm. An atmosphere, impregnated with tar heated over an oil or spirit lamp, has also in many instances been found essentially to invigorate the respiratory powers; and to these, where there is much cough, should be added expectorants and the warmer demulcents. After pursuing this plan for some weeks, pure air and the aerated mineral waters, where the case is not inveterate, will add a healthy degree of tone, and restore the respiratory organs to their natural action. Galvanism has also occasionally

Remedial process.

Galvanism.

* See Laennec on Diseases of the Chest, &c., transl. by Forbes, p. 137, 2d. edit. † Rammazini, de Morbis Artificum.—Ephem. Vratisl.

‡ On Indigestion, &c. p. 379, 4th edit. 8vo. Lond. 1824.

GEN. III. We sometimes find a permanent difficulty of breathing in
 SPEC. I. persons labouring under GREAT TORPOR OR SLUGGISHNESS OF VAS-
 D. chro- cular ACTION. The pulse is slow and unresisting; the muscles
 nica phleg- are soon fatigued; the mind has little energy; the face is pal-
 matica. lid; the skin cold and soft; the urine scanty, and the extremi-
 Symptoms. ties œdematous, without any pathognomonic symptoms of dropsy
 in the chest, or at least any sensible fluctuation in the thorax.
 Causes. It is the *dyspnœa aquosa* of Cullen, and the *dyspnœa pituitosa* of
 Sauvages. Whatever has a tendency to depress the living
 power, and particularly in flaccid and atonic habits, will readily
 lay a foundation for this variety of dyspnœa; and hence it is a
 frequent result of catching cold in the feet, and still more fre-
 quently of suppressed perspiration. It also occasionally follows
 chronic catarrhs, and pneumonitis.

Medical treatment. A tonic and gently stimulant plan, consisting of the warm
 gums, camphor and other terebinthines, the warmer bitters,
 the oxydes of zinc and iron, the compound squill pills, the
 warm-bath, moderate exercise, and a generous diet, will be the
 most successful mode of treatment; occasionally interposing an-
 timonial emetics: which will relieve the lungs far more effect-
 ually than those of ipecacuan, as operating longer on the mov-
 ing powers of the chest. Of the terebinthinate tribe, the best,
 perhaps, is the balsam of copaiba, given in doses of a drachm or
 a drachm and a half three or four times a-day. Nothing suc-
 ceeds so well in restoring the secretion of mucus where it has
 ceased or become deficient; or in producing a healthy discharge
 where its nature has been changed by morbid action. On which
 account, this medicine may almost be regarded as a specific in
 morbid secretions of mucous membranes, whether of the lungs,
 the intestinal canal, or the urethra: as it has often proved high-
 ly serviceable in croup. The chief difficulty is in devising a
 convenient form for its exhibition, since it sometimes excites
 nausea.

D. chro- The variety of least moment, perhaps, to the dyspnetic pa-
 nica pin- tient, is that which proceeds from, or is accompanied with, a
 guedinos. short, stunted figure, and considerable corpulence, or at least
 Description. OBESITY OF THE CHEST. We see persons of this description, sig-
 nificantly described by the colloquial term *pursy*, pant, and per-
 spire, and grow fatigued, day after day, upon very little exer-
 cise, and yet press on without any serious inconvenience to a
 late period of life; or, if they sink suddenly and sooner, they
 yield rather to apoplexy as a result of their general habit, than
 to the idiopathic affection before us. [According to Laennec,
 this case is in a great measure nervous, and is to be attributed
 to the great expenditure of nervous influence, required to move
 a mass so disproportioned to the ordinary powers of motion.*]
 Treatment. Abstinence from spirits, wines, and fermented beverages, a me-
 agre allowance of animal food, a soluble state of the bowels, and
 exercise, rather persevering than violent, will form the best
 plan for the present ease, and the best guard against threatened

* Op. cit. p. 404.

mischief. Bleeding has often been tried, but it affords only temporary relief. Sauvages gives us the history of a female, who for two years had been so far suffocated, that it had often been judged necessary to bleed her three times a-day at least, and she had undergone not fewer, than two thousand venesections, when she applied to him. She was plunged into a warm-bath, the bath was frequently repeated, and friction at the same time made use of, so as to excite violent perspiration: by this means she was convalescent in ten days.

GEN. III.
SPEC. I.
* D. chronica pin-guedinosa.
Venesection of only temporary use.
Remarkable instance.

Dyspnœa has also sometimes been produced by causes somewhat more singular, as common respirable air obtaining an entry into cavities in the chest, or to which it does not naturally belong. Stoll gives a case of dyspnœa, in which air-bladders, or vesicles, were seated on the surface of the lungs.* [This state is particularly described by Laennec in his valuable account of emphysema of the lungs: after mentioning the enlargement of the air-cells, he says, sometimes we observe on the surface of the lungs single vesicles, distended to the size of a cherry-stone, or even larger, quite prominent, exactly globular, and apparently pediculated. The term *apparently* is used, because, on cutting into them, we find, that there is no real pedicle, but merely a constriction at the point, where the cell begins to rise beyond the surface of the lungs. The dilated cell in fact communicates with the adjoining ones and the bronchiæ; and the case is not one of a mere extravasation of air under the pleura. What he calls pulmonary emphysema consists essentially in the dilatation of the air-cells, and the projection of air on the surface of the lungs, constituting the larger and more prominent vesicles, is a posterior affection, and of slight importance, compared with the dilatation of the cells; because hopes may be entertained of its removal by absorption, while we cannot well see how nature or art can remedy the other morbid alteration, which, however, Laennec does not pronounce absolutely incurable.†] Gooch and various others mention examples of air let loose between the lungs and the pleura. In Timæus we have a specimen of a very extraordinary idiosyncrasy, giving rise to a difficulty of breathing upon an inhalation of the smell of roses.‡ The morbid influence of metallic action is not confined to vapour locally applied; for in Schenck we have a case of dyspnœa produced by mercurial inunction;§ and, in other books, of a like effect on peculiar constitutions by a solution of the oxydes of lead taken internally, or even applied externally.||

Singular causes.

Vesicular emphysema.

[According to Laennec,¶ some of the air-cells of the lungs of subjects, who have long suffered from any kind of dyspnœa, are almost always found preternaturally dilated. In other words, these organs are in the state of *vesicular* or *pulmonary* emphy-

* Nat. Med. P. vii. p. 135. † See Laennec on Diseases of the Chest, and Mediate Auscultation, pp. 149. 152—163. 2d. edit. ‡ Case, p. 216.

§ Observat. Rar. Lib. II. p. 63. || Eph. Nat. Cur. Dec. III. Ann. IV. Obs. 30. ¶ Op. cit. p. 151. Transl. 2d edit.

GEN. III.
SPEC. I.

* D. chronica pin-
guedinosa.

sema, which he distinguishes from the *interlobular*, well known to surgeons. He looks upon vesicular emphysema as being almost always the consequence of dry catarrh, and presenting the same indications of cure. "Frictions with oil are often very useful in lessening the susceptibility to be affected by catarrh. In the case of pallid, cachectic subjects, the subcarbonate of iron has occasionally seemed to have a similar effect, and to tend at the same time to diminish the congestion of the mucous membrane, and spasmodic stricture of the bronchiæ. In the severer asthmatic paroxysms, it is frequently necessary to have recourse to venesection, in order to relieve the congestion of blood in the lungs; and it is always proper to diminish the necessity of respiration by means of narcotics."]

Chronic
dyspnœa.

Chronic dyspnœa appears also as a symptom or sequel in various other diseases, or affections of various other organs; as aneurism, ossification, or other mischief in the heart, or aorta; any morbid change in the diaphragm, ribs, or pleura, by which the cavity of the thorax is diminished, or the moving powers restrained in their action; parabysmic enlargements of the liver, spleen, or omentum; whence it is obvious, that it must, in a greater or less degree, be an attendant on the latter period of pregnancy. It has also followed occasionally, not only suppressed perspiration, but the suppression of various cutaneous eruptions, and, in a few instances, the sudden closure of an issue, or seton, of long standing.*

SPECIES II. Dyspnœa Exacerbans.—*Exacerbating Anhelation.*

The disease subject to sudden and irregular exacerbations; breathing deep, stertorous, acute, and suffocative; relieved by an erect position.

How pro-
duced.

This species admits of most of the varieties of the preceding, which it is hence unnecessary to repeat; and, like it, is often found as a symptom in aneurisms, polypous concretions, and other affections of the heart and larger vessels; in parabysma, and other affections of the abdominal viscera; in empyema, dropsy of the chest, worms, peripneumony, bastard peripneumony, small-pox, and occasionally in severe accessions of intermitting fevers. I have already, indeed, stated, that there is scarcely a function, with which the action of the lungs is not connected, and consequently scarcely a disease of any importance in which it does not occasionally participate. Whatever be the cause that produces anhelation, or permanent difficulty of breathing, in a patient, any accidental augmentation of it, or any sudden excitement of body or mind, or any diseased action of any kind, capable of uniting with the primary cause directly or remotely, will increase its power, and not unfrequently in-

* Riedlin, Lin. Med. 1695, p. 91.

duce a spasmodic constriction in the muscles of respiration. And it is this accidental exacerbation, produced irregularly by casual and often occult causes, and especially in irritable or nervous temperaments, that peculiarly distinguishes this species from the preceding. In asthma the returns are for the most part strictly periodical, and the intervals perfectly free from difficulty of breathing. In exacerbating dyspnœa, the constriction occurs with the utmost irregularity, in the day time, at night, in hot or cold weather, in a moist or dry atmosphere; and it is hence sufficiently distinguished from asthma. A catarrhal cough will sometimes prove an occasional cause; several of the varieties of heart-burn, and especially *cardialgia syncopalis*, still more frequently: other causes are, indigestible food, a fit of hysterics, or any violent commotion or agitation. While, as already observed, the occasional cause is often beyond the power of detection.

When the constrictive paroxysm makes its attack, it must be immediately opposed by an erect position, without which suffocation would often instantly ensue; and by the most powerful antispasmodics. Tincture of opium, ether, and ammonia, are what I have chiefly trusted to, and have uniformly found far more to be depended upon than castor, or any other odorous antispasmodics in whatever quantity given. A large blister to the chest should also be immediately applied; and, if the paroxysm do not yield soon, sinapisms to the feet. Upon its cessation, the gum ammoniac mixture, or a solution of assafoetida, with camphorated tincture of opium, will be found a convenient guard against fresh attacks, provided due attention be paid to the state of the bowels, which ought indeed to form an early consideration. Issues have been recommended as a preventive of the paroxysm, where its approach has been expected, and I have sometimes thought them of efficacy. For this species, however, perhaps the most effectual means of relief are to be derived from the application of the voltaic battery, as already proposed for anhelation from poisonous vapours; and as has been successfully tried in numerous instances of the present species by Dr. Philip, who was first induced to apply this remedy from observing, that animals, whose eighth pair of nerves had been divided, exhibited the oppressed breathing and accumulation of phlegm that characterizes both species of dyspnœa, and were relieved by having a stream of voltaic aura sent through the lungs.

The accompanying cough, instead of being increased by the use of the voltaic power, is hereby diminished, in consequence of its diminishing the accumulation of phlegm in the lungs. In proper asthma, which is characterized by intervals of free and healthy breathing, little or no benefit has been derived from this process; and hence Dr. Philip very ingeniously reasons, that, although in both diseases the nerves of the respirable organ are alone in a morbid condition, and not the brain or spinal marrow; yet in the former, they are still capable of being recalled to a state of healthy activity, or of becoming sufficiently

GEN. III.
SPEC. II.

Dyspnœa
exacerbans.
Present species how peculiarly distinguished from the preceding: and from asthma.

Therapia.

Sedatives
and anti-
spasmodics.

Blisters.

Issues.

Voltaic battery as employed by Philip.

Mode of
action.

GEN. III.
SPEC. II.
Dyspnœa
exacerbans.

cleared to form a passage for the supply of nervous influence to the lungs, which effect he supposes to be obtained by the use of the voltaic machine.

The American pathologists have found great benefit from various preparations of the *lobelia inflata*, or Indian tobacco, which certainly possesses powerful antispasmodic and expectorant virtues; and has hence a fair claim to more extensive trial, than it has yet received. The ordinary form is that of a saturated tincture of the leaves, prepared by digesting two ounces in a pint of proof spirit: the dose of which is from a tea-spoon to a table-spoonful, repeated every half hour or oftener till the paroxysm is conquered.*

GENUS IV. ASTHMA.—*ASTHMA*.

Difficulty of breathing temporary, recurrent; accompanied with a wheezing sound and sense of constriction in the chest; with cough and expectoration.

Nearly connected with
dyspnœa.

ASTHMA, as already observed under dyspnœa, is closely connected with the latter, and particularly with its second species, characterized by what might be strictly called asthmatic exacerbations, and which I have hence denominated *dyspnœa exacerbans*.

The definition of the disease now offered, while it shows the proximity of the one to the other, is sufficient, if I mistake not, to form a marked and accurate distinction. The vulgar term for the complaint in our own language is *broken-wind*; which, as scientific precision is seldom an object of popular language, is often, also, applied to some of the varieties noticed under dyspnœa, or *short-breath*.

Not common in
early life,
though
sometimes
found, and
particularly
in infancy.

Asthma is more commonly a disease of the later, than the earlier period of life; for it does not often appear in infancy or youth, although occasional instances of this have occurred, particularly in infancy, that have been mistaken for cases of croup, which the asthma of infancy very much resembles, though admitting of a more easy cure. It soon becomes habitual, and seems sometimes to be hereditary.

Precursive
symptoms.

The paroxysms of asthma are frequently preceded by languor, flatulency, head-ache, heaviness over the eyes, sickness, pale urine, disturbed rest, and a sense of straitness, fulness, and anxiety about the præcordia. "When the evening approaches," says Dr. Bree, who unhappily describes from his own history, "the weight over the eyes becomes more oppressive, and the patient is very sleepy. Frequently, at this period, there is a tingling and heat in the ears, neck, and breast; and a motion to expel the contents of the bowels is attempted, with some violence and with great uneasiness of the abdominal muscles.

* A Treatise on the Materia Medica, &c., by John Eberle, M.D., 2 vols. 8vo. Philadelphia. 1822. Also Dr. Andrew's Report in Glasgow Med. Journ. vol. i. p. 177.

When an asthmatic feels these warnings, he may be convinced that his enemy is at hand.*

GEN. IV.

Asthma.

Accession
about
midnight.

The accession is usually about the middle of the night, and during the first and deepest sleep: the cause of which has not been rendered very manifest, though I do not think it beyond the reach of explanation, and especially in constitutions predisposed to the disease by habit or hereditary affection. Respiration always takes place most easily in a raised or erect position, but in the night the body is recumbent. Respiration is also so much of a voluntary action, that although it continues during sleep, and when the will is not exerted, it is considerably aided by the concurrence of the will. Now during sleep this concurrence is wanting; and hence the most favourable period for the attack of this insidious complaint is that, in which we actually find it makes its appearance—during a recumbent position of the body, when the muscles of respiration are destitute of the stimulus of volition. When the disease indeed has once established itself and become habitual, it will recur at other times also, but less frequently.

Why at
this time
explained.

For the most part, the patient wakes suddenly, and feels a most distressing tightness about the chest, as if he were bound with cords: his anxiety is inexpressible, and he labours for breath as though every moment would be his last. He is obliged to sit erect, breathes distressfully with a wheezing sound, and cannot bear the weight of the bed clothes. Cool fresh air is the object of his intense desire. At the same time, the extremities are cold; the heart palpitates; the pulse is sometimes quickened, but usually weak, irregular, and often intermitting; the abdomen is distended with flatulence; the stomach is faint, and often rejects with great violence a slimy and frothy material of a greenish or yellowish hue. The eyes stare prominently, and the face is sometimes pale, but more commonly bloated and livid; and the alvine canal, though costive before, will now perhaps pass a loose stool.

Descrip-
tion.

In many instances, there is an ineffectual effort to excrete, with a harsh and dry cough that brings up nothing more than a little clammy or frothy mucus. And, in these cases, the fit usually subsides, or perhaps altogether leaves the patient in two or three hours. But, in other instances, the cough is far more violent and suffocative; and, when it has lasted for an hour or two, an expectoration of tough viscid mucus commences, and gradually becomes copious and affords relief. It is occasionally mixed with blood from the severity of the struggle; but the larger the discharge of either, or of both, the more the bronchial vessels are relieved.

Relieved by
a discharge
of mucus or
blood.

It is often, however, many hours before a paroxysm of this kind very sensibly subsides; and the patient generally feels some degree of constriction during the whole of the ensuing day; and is fortunate, if the next night be passed without a similar fit. The tendency to such returns usually continues for

Paroxysm
often lasts
many hours,
and some-
times re-
turns the
ensuing
night.

* Inquiry into Disordered Respiration, sect. IV. p. 46.

GEN. IV.
Asthma.

Often lasts
for a week
or a fort-
night.

Has con-
tinued for
seven
weeks.

Not often
fatal at the
time of
attack;
but occa-
sionally in-
duces dan-
gerous com-
plaints.

Exciting
causes nu-
merous, but
all resolvable
into irrita-
tion of the
chest.

Sometimes
symptoma-
tic and de-
pendent on
a remote
organ.

Whether
spasmodic

several nights; in severe cases, for a week or a fortnight. Sir John Floyer, who, from describing his own sufferings, has given us one of the best historical accounts of the disease that has ever been written, mentions a case, in which the fits recurred for seven weeks together; during the whole of which time, the patient was obliged to sit erect in a chair.

Yet, notwithstanding the violence of the assault, it is not often that asthma, under either of these forms, proves fatal at the time: for this "*morbis maximè terribilis*," as it is called by Willis, "may be carried on to old age, if supervening diseases do not destroy the patient, or disturb the operations of nature, by which a recovery from the paroxysm may be obtained."* But it rarely makes a first attack without subjecting the constitution to subsequent returns; and frequently, by the debility which it hereby produces, lays a foundation for tubercular phthisis, dropsies of the chest or abdomen, aneurisms of the heart, and various other fatal diseases, [which, however, according to the editor's reasoning, should generally be considered as causes, and not as effects of the disturbance of respiration.] Whilst it occasionally happens, even where none of these take place, that the mucous glands of the bronchiæ become relaxed, an habitual excess of secretion ensues, and a troublesome dyspnoea is the consequence, from the overloaded state of the air-cells and bronchial vessels; a mischief, which, in such cases, is felt most oppressively on first awaking, and is only relieved by a long labour of severe coughing. This overloaded state of the bronchiæ and air-cells, from too large a secretion of mucus, is, indeed, at the time, an original exciting cause of the disease; and has by some writers, and especially in our own day by Dr. Bree, been supposed to be the chief cause.

The exciting causes, however, are numerous, and it is difficult to say which is the chief: nor always easy to ascertain them satisfactorily. Yet they may be all resolved into an irritation of some kind or other, existing within the cavity of the chest, and stimulating its moving powers to a convulsive constriction. I say existing *within* the cavity of the chest, because we are now considering asthma as an idiopathic disease. Yet it happens not unfrequently, that it occurs as a mere symptom, or result of some other disease, or of a morbid state of some remote organ, as the stomach, liver, or spleen; in which case, it becomes a secondary affection, and is only to be removed by removing the primary disorder on which it is dependent.

[As Corvisart has very truly observed, the ancients confounded, under the name of *asthma*, several varieties of dyspnoea arising from different organic diseases, and which they very incorrectly regarded as nervous affections. He has the merit of having thrown a great deal of light on those varieties, in particular, which depend upon organic diseases of the heart and large blood-vessels.]

Whether the suffocative tightness of the chest, be the result

* Bree's Inquiry, &c. sect. VI. p. 71.

of a spasmodic stricture of the bronchial vessels spreading thence to the muscles of respiration; or produced by an infarction of these vessels from a superabundant effusion from their exhalants, is a question of a very different kind. Willis first started the former opinion, which has flowed in a regular current, or with little opposition, through Floyer, Hoffman, and Cullen to the present day. [Its possibility has lately received important corroboration from the anatomical researches of Reisseissen, who has ascertained the existence of a set of completely circular fibres around the bronchial ramifications, beginning at the point where the cartilaginous circles terminate. Laennec has also verified the correctness of this observation upon branches of less than a line in diameter; and he remarks, that, although it be difficult to follow the muscular fibres to a greater distance, analogy leads us to admit their existence, certainly, in the smaller branches, and, perhaps, even in the air-cells. Adopting this view of the subject, he conceives, that the spasmodic contraction of these fibres may take place in such a degree as to prevent the transmission of air to a great portion of the lungs. It is also farther maintained by Laennec, that the study of respiration, by means of auscultation, furnishes us, both in health and disease, with proofs of the lungs possessing an inherent power of action. This author is too intelligent, however, to refer asthma exclusively to the operation of any single uncombined cause.*] Dr. Bree has lately proposed the second doctrine above specified, and supported it with great ingenuity and learning; illustrating and fortifying his views by numerous references to unquestionable facts, and the opinions of earlier writers. The same principle, or at least a modification of it, has been adopted by Dr. Parry, who places the vascular turgescence in the mucous membrane lining the bronchial cells.

Admitting the former hypothesis, the thoracic convulsion is a diseased action from the beginning, and under every degree and modification, and is so regarded by its advocates: while Dr. Bree only allows it to be so when the convulsive action is violent; contending that in its commencement it is altogether a remedial effort, an instinctive attempt to expel the serum or mucus that clogs the bronchial vessels. And he hence accounts for the pathognomonic wheezing, which he does not think the idea of a spasmodic stricture of these vessels is sufficient to explain; as also for the general inefficacy of opium and antispasmodics, to whatever extent they may be carried.

I have already stated, that an excessive secretion from the exhalants of the bronchiæ may be an exciting cause in many cases, and particularly in a relaxed and debilitated condition of the bronchial vessels in consequence of former attacks. But, notwithstanding the masterly manner in which Dr. Bree has argued this point, I cannot regard such a secretion as a common cause of asthma, since, in numerous instances, I have observed, in the words of Sir John Floyer, that "the lungs do not appear

GEN. IV.

Asthma.

stricture or mucous infarction be the common cause.

The first advanced by Willis.

The second by Dr. Bree.

Under the first view, the convulsive action is morbid at all times and in all degrees.

Under the second, only when in excess.

Difficulty of regarding secretion as the general cause.

* See Laennec on Diseases of the Chest, &c. 2d edit., p. 408.

GEN. IV.
Asthma.

Especially
in dry or
nervous
asthma.

And hence
a spasm of
the bron-
chiæ the
most ob-
vious cause
in these
cases.

The prac-
tice sug-
gested by
the one
opinion not
necessarily
at variance
with that
suggested
by the
other.

Asthma
with puerile
respiration.

to be much oppressed with phlegm before the fit; and, at the end of the fit, the straitness goes off *before* any considerable quantity is spit up:” while in, what is commonly called, the dry, nervous, or convulsive asthma, there is always very little, and sometimes no mucus whatever excreted from the beginning to the end of the paroxysm. It may, indeed, be maintained, that the secretion is absorbed, but this is to beg the question, for we have no proofs of such an absorption. The existence of accumulated mucus in the bronchial vessels of those who have died of asthma, and whose bodies have been opened, does nothing more, than establish the fact in those particular cases. And even here we are left in total darkness, whether the serum or mucus anticipated the suffocative convulsion and was the cause of it, or whether the latter anticipated the serous or mucous effusion, and forced it into the vessels in which it has been found on dissection. How far the suffocative convulsion may originate in a spasm of the bronchiæ, as contended for by Dr. Cullen, we have no means of determining manifestly. That it may exist, however, as well as a spasm of the alimentary canal, no one has been bold enough to deny; that it must produce that strangling constriction or straitness which is a pathognomonic sign of asthma, where it does exist, can be as little doubted; and I find it extremely difficult to ascribe the disease to any other state of the bronchiæ, in all cases of dry or nervous asthma, in which, as there is little or no discharge from the lungs, we have full ground for inferring, that there is little or no accumulation within them. “It is not, however, intended,” says Dr. Bree, “to deny the possible existence of this spasm, but to object to it as a proximate cause; and to state the imprudence of depending upon it as an important indication in practice.”* Yet it does not appear to me, that the practice, suggested by the one opinion, needs to be so much at variance with that suggested by the other, as this passage would seem to intimate. For if acids prove a beneficial mode of treatment, and that benefit be ascribed by the upholder of the muculent hypothesis to the astringent power of the acid, by which the flow of mucus is restrained; it may be ascribed by the upholder of the spasmodic hypothesis to the very same power, by which, as a tonic, it takes off irritability, and allays all muscular irregularities.

[Professor Laennec has divided that form of the present disease, in which no organic lesion is discoverable, into two kinds; in one, when the chest is examined with the stethoscope, the respiration is very sonorous, like that of children; and hence he calls the disease *asthma with puerile respiration*. In this instance, the patient constantly feels the want of a more extensive respiration, than what he enjoys. The dyspnœa is frequently very intense, and is sometimes so aggravated by the slightest motion, that the patient is condemned to a life of inactivity. Laennec ascribes the disease to the state of the nervous system. He has never met with this species of asthma, except in persons affect-

* Inquiry, &c. sect. vii. p. 106.

† Laennec, Op. cit. p. 405—407.

ed with chronic mucous catarrh. The other form of asthma, noticed by Laennec as unconnected with organic disease, is what he names, with other writers, *spasmodic asthma*.*]

GEN. IV.
Asthma.

Dr. Bree's division of the disease is founded upon causes, rather than upon symptoms; and he has hence divided it into the four following species:—Firstly, those cases, being most numerous and common, which are produced by the irritation of effused serum in the lungs.—Secondly, those produced by the irritation of aerial acrimony in the lungs.—Thirdly, those dependent on irritation in the stomach, or some of the abdominal viscera.—And, fourthly, those dependent upon habit.

Subdivisions as arranged by Dr. Bree from supposed causes.

[The author of the present work has not adverted to the valuable writings of Laennec on this subject, who shows, that the most common cause of dyspnœa, when of sufficient severity to be termed asthma, is a dry catarrh inducing emphysema of the lungs, that is to say, a preternatural dilatation of the air-cells. In some rare cases, where the progress of œdema of the lungs is very slow, asthmatic symptoms may also be produced. These morbid states, which have been amply verified by morbid anatomy, deserve the particular recollection of the practitioner.]

As the definitions under the present classification are founded upon a principle of symptomatology rather than of etiology, it will not be in my power to adopt Dr. Bree's divisions in the exact terms and order in which he has given them; though it will be found, that his first two species run nearly parallel with the only two to which I propose to limit the genus; and which will be wide enough to embrace his fourth, or those cases of the disease, which, whatever be their symptoms, depend on an established habit: while the third species of Dr. Bree, comprising cases, in which asthma is not an idiopathic affection, but a sign or result of morbid action in some organ remote from the lungs, cannot be correctly treated of in the present place; the affections included under it being alone to be remedied by remedying the primary disease on which it is dependent.

From the view then thus offered, and from other symptoms that we shall have presently to take notice of, it will, I think, be found convenient to contemplate the genus ASTHMA, as comprising, and limited to, the two following species:

- | | | |
|--------------------|---------------|-----------------|
| 1. ASTHMA SICCCUM. | DRY ASTHMA. | NERVOUS ASTHMA. |
| 2. ——— HUMIDUM. | HUMID ASTHMA. | COMMON ASTHMA. |

SPECIES I. Asthma Siccum.—*Dry Asthma. Nervous Asthma.*

Paroxysm sudden, violent, and of short duration, constriction hard, dry, spasmodic; cough slight; expectoration scanty, and only appearing towards the close of the fit.

Thus is the proper convulsive or nervous asthma of Willis, Hoffman, Floyer, and Akenside. Its predisposing cause we are

Convulsive or nervous asthma.

* Laennec, Op. cit. p. 405—407.

GEN. IV.
SPEC. I.Asthma
siccum.Predispos-
ing cause
sometimes
obvious.Occasional
cause often
concealed.

sometimes capable of developing : for we can trace the disease to a morbid structure of the chest, to an irritable condition of the bronchial vessels, or parenchyma of the lungs, produced by a pleuritis, or a succession of severe and protracted winter coughs ; or to an hereditary source. Of the occasional causes, however, we are often in great ignorance ; and mostly so where the disease appears in its simplest character, and totally unconnected with any other affection. In some instances, it evidently follows the sudden repulsion of cutaneous eruptions ; in others, the sudden cessation of œdematous swellings in the extremities of cachectic patients ; and, not unfrequently, the inhalation of deleterious exhalations : most of which we have already noticed as occasional causes of dyspnœa, and dry or humid cough. So that it is probably a mere difference in the constitution or habit, that renders these causes capable of producing one of these diseases, rather than another. And hence dry asthma, like the preceding, as thus diversified by its occasional causes, may be contemplated under the following varieties :

- | | |
|--|--|
| α Simplex. Simple nervous asthma. | Without any obvious cause or connexion with any other affection. |
| β Metastaticum. Repelled eruptions. | From retropulsion of some cutaneous affection. |
| γ Phlegmaticum. A cachectic frame. | From repelled œdema of the extremities in phlegmatic or cachectic habits, with a scanty secretion of urine. |
| δ Vaporosum. Deleterious exhalations. | From inhaled fumes of metals, especially of lead and arsenic ; of sulphur, charcoal, nitric acid, and other deleterious or poisonous substances. |
| ε Organicum. Organic misformation. | From organic derangement of the walls or contents of the chest. |

α A. siccum
simplex.

THE FIRST OF THESE varieties constitutes the second species of Dr. Bree, who supposes the unknown and exciting cause to reside in some "subtile acrimony *always* present in the atmosphere in a greater or less degree, and ready to be inspired."* It is at least difficult to disprove this opinion ; but, admitting the fact, we can make little use of it, and are nearly as much in the dark as ever.

Whether
from acrimony in the
atmosphere.Found most
commonly
in nervous
habits.

It is a position of far more general assent, that this modification of asthma is more likely to occur "in proportion as the habit is disposed to the condition called nervous."† The paroxysm, indeed, frequently makes its attack under those circumstances, which are most apt to try the strings of a nervous temperament. A sudden emotion of the mind will give rise to

* Inquiry, &c. p. 192.

† Ibid. p. 191.

it; an alteration of the wind, a change of residence, or a meal that disagrees with the stomach; and often there is a considerable evacuation of pale urine. While on the contrary, as already observed, it more usually makes its attack without any one of these harbingers, or any other that can be traced out. The small quantity of viscid mucus that is excreted through the whole of the struggle, proves evidently, that the inner membrane of the bronchial vessels is in a state of peculiar dryness; and leads us to conceive, that, at the onset, it was nearly or altogether destitute of its lubricating fluid. It is on this account, that the cough and wheezing are both slight.

[According to Professor Laennec, an attack of purely nervous asthma is rarely fatal, and indeed is hardly ever so, without previously giving rise to congestions of blood, and other consequences of the disorder of the respiration and circulation induced by it; and, in these consequences, he observes, prejudiced minds may see the causes of the disease. He has met with many cases, however, in which it was impossible, after the most minute research, to find any organic lesion whatsoever, to which the asthma could be attributed. An instance of this is given by M. Andral in the case of a fatal suffocation, following the suppression of a discharge from an ulcerated leg.* M. Guersent records the cases of two children, who died in a few days of a remitting dyspnœa, attended with dry cough and præcordial anxiety, in whose bodies no obvious lesion could be found after death.† Laennec is convinced, that, in the greater number of asthmatic cases, depending on dry catarrh and pulmonary emphysema, the asthmatic paroxysm can be induced equally by the supervention of a fresh catarrh, and by a deranged state of the nervous influence, occasioning pulmonary spasm, or an increase of the necessity of respiration, and sometimes by both causes at once. He believes, in fact, that few cases are owing to any one of these causes; and that, in old men particularly, several are frequently concerned. Of this kind are debility; ossification of the cartilages, and immobility of the ribs; rheumatism affecting the walls of the chest; and, perhaps, also the tenuity of the air-cells, and of all the pulmonary vessels in advanced life. With the exception of the different kinds of catarrh, the occasional causes of the attacks of asthma are almost always such as are calculated to produce immediate and evident disturbance of the nerves: a strong mental emotion; venereal excesses; the influence of light and darkness; retrocession of gout; certain odours, such as those of tuberose, heliotrope, stored apples, &c.; changes of the atmospheric electricity, and other less appreciable conditions of the atmosphere. We find that the greater number of asthmatic patients cannot remain with impunity in a low close apartment, although containing much more air than they could consume in twenty-four hours; and although it is constantly, but insensibly, renewed by the doors and chimneys. Some cannot

GEN. IV.
SPEC. I.
α A. siccum
simplex.

Laennec's
opinions.

* Clinique Méd. tom. ii. Obs. 20.

† Dict. de Méd. tom. iii. p. 126.

GEN. IV.

SPEC. I.

α A. sic-
cum
simplex.

β A. sic-
cum metas-
taticum.

γ A. sic-
cum phleg-
maticum.

δ A. sic-
cum vapo-
rosuū.

bear any person to go before them, or any thing to be brought close to them, without experiencing a sense of suffocation; while others are never more subject to dyspnœa, than in the midst of a large plain.*]

Cases of the species of asthma before us, and even of humid asthma, occurring upon a SUDDEN DISAPPEARANCE OF scabid, herpetic, and other CUTANEOUS ERUPTIONS, are so common, that it is hardly worth while to dwell upon them. They are especially noticed by Sir John Floyer, and have rarely escaped the attention of any pathologist since his day. And that this is an actual cause of the disease, is perfectly manifest from the subsidence of the latter as soon as such eruption has been re-excited. A sudden disappearance of gout in the hand or foot, or of an habitual discharge, as that of the hemorrhoidal vessels, has operated in the same manner, while a renewal of these affections has proved an equal remedy.

But those of relaxed and PHLEGMATIC HABITS are peculiarly affected by such transfers of morbid action, particularly when the feet and ankles are habitually œdematous, and accustomed to enlarge towards night. Chronic or exacerbating dyspnœa is a frequent attendant upon such a state of corporeal debility; and hence, we have reason to expect asthma also: for farther information upon which subject the reader may turn to what has already been observed under *dyspnœa chronica*.

It is not surprising, that asthma should be produced by the INHALED FUMES OF METALS, and other mineral substances, since we see it also frequently occasioned, in constitutions prone to the complaint, by clouds of common smoke or dust. And Dr. Percival informs me, that he has met with two cases, in which slight apoplexies were concomitants of asthma, produced by concentrated fumes of nitrous acid; here again leading to the same train of causes we have already noticed, as laying a foundation for chronic dyspnœa.

To this subdivision, also, belong such cases of asthma as proceed from fogs and mists, especially those of populous and extensive towns, which many asthmatics are obliged to abandon, as soon as November makes its appearance, for a drier and less hazy atmosphere. The coats of the bronchiæ seem to be constricted by the inhaled vapour; and hence the suffocative feeling. Where, however, the internal tunic of the bronchiæ is habitually dry and irritable, the moisture of such an atmosphere cools and softens the harsh membrane, and the patient longs for such a situation, instead of flying from it. And hence the reason why fogs are poisonous to some asthmatics and healthy to others. It is also probable that the altered gravity of the atmosphere, in these cases, and the larger and smaller doses of oxygen inhaled in every inspiration, produce some influence, that proves beneficial or injurious according to the habit or actual state of the air-vessels. And hence, again, while some asthmatics can only live in a mountainous situation, others find their only relief in lowlands and valleys.

* See Laennec on Diseases of the Chest, &c. 2d edit., p. 412.

An impregnation of the atmosphere with odorous essences, has also been found in a few cases of uncommon idiosyncrasy, or where the air-vessels have been peculiarly sensible, a sufficient cause of the asthmatic paroxysm; which has hence been produced by the smell of musk, and in one instance, related by Timæus, by that of roses.* And, in consequence, it is not to be wondered at, that more pungent and perhaps acuated corpuscles should produce a like effect. Dr. Scott, of Northumberland, has given cases of the greatest danger and extremity occasioned by accidentally inhaling the effluvia of ipecacuan whilst pulverizing.†

GEN. IV.
SPEC. I.
§ A. sic-
cum vapo-
rosum.
From odo-
rous es-
sences.

Another and a very frequent cause of both species of asthma, but more particularly the *asthma siccum*, is some organic derangement of the walls or contents of the chest. Gibbosity is one of the most common of the present group of causes. Lommæus asserts, after Hippocrates,‡ that if a person become gibbous before puberty, in consequence of asthma, he dies.§ On which Dr. Bree has well observed, that the authors have here substituted cause for effect,|| since it is rather the gibbosity that produces the asthma, than the asthma that produces the gibbosity. An osseous and consequently rigid condition of the cartilaginous extremities of the ribs and sternum; pressure upon the lungs produced by a dropsy of the chest, or of the pericardium; by an empyema; by vomicas or indurated tumours of whatever kind in the substance of the lungs; an inordinate magnitude of the lungs themselves; have all been found occasional causes of asthma, and are among the most formidable to be attacked. Haller, Bonet, Morgagni, and others, who have been peculiarly attentive to structural diseases and their effects, have recorded numerous instances of this kind. And the later examinations of M. Rostan have added other morbid changes to those already noticed, in the heart indeed as well as in the lungs. In the first of these, he has very frequently found that particular kind of thickening of the left ventricle of the heart, to which the French have given the name of active aneurism: and, in the second, besides the morbid lesions already noticed, adhesions between the lungs and the pleura; effusions of serum into the cavity of the chest; and a general change of structure in the lungs, giving them a semblance of the organ of the liver. Several of these appearances are most probably effects of the disease, though by M. Rostan uniformly regarded as causes.

§. A. sic-
cum organi-
cum.

[It was strongly suspected by Laennec,¶ that, in some rare instances of asthmatic dyspnoea, an imperfect paralysis of the diaphragm, and other muscles of inspiration, was concerned.]

The general treatment of this distressing affection is still a matter of discussion. A considerable distinction is necessary in the two species under which it makes its appearance; and hence it will be more advantageous to defer the consideration

Medical
treatment.

* Cas. 216. † Edinb. Med. Comment. vol. iv. p. 75. ‡ Aph. XLVI. Sect. 6. § Lomm. Obs. Med. II. p. 146. || Inquiry, &c. p. 24.

¶ On Diseases of the Chest, &c. p. 404. 2d. ed.

GEN. IV. of this subject, till we have noticed somewhat more at large the
SPEC. I. history of humid asthma, so that the plan, proper for the one,
may stand in contrast with that proper for the other.

SPECIES II. Asthma Humidum.—*Humid Asthma.* *Common Asthma.*

Paroxysm gradual ; ingravescens, protracted ; constriction heavy, humid, laborious ; cough severe ; expectoration commencing early ; at first scanty and viscid, afterwards copious and affording great relief.

THIS is the ordinary form under which the asthmatic paroxysm shows itself ; and the trivial name of humid or humoral was given to it by earlier writers, most of them advocates of the humoral pathology, from an idea that an acrid humour was hereby discharged from the general mass of the blood, and consequently that the expuition was to be encouraged as much as possible ; the suffocative struggle being regarded as an instinctive or remedial effort of nature to restore the system to a state of health.

Generally appears without any obvious cause : though sometimes the contrary.

Like the preceding species, it very generally appears without any obvious cause or connexion with any other affection. In some cases, however, it seems to be the result of a plethora, or, as Dr. Cullen expresses himself, “ a turgescence of the blood, or any other cause of an unusual fulness and distention of the vessels of the lungs.”* And sometimes, as in old age, or after long continued and repeated catarrhs, it is produced by an excess of serum or mucus flowing inordinately from a weakened and relaxed state of the bronchial exhalants or mucous glands : thus offering us three varieties as follow :

- | | |
|------------------------------------|--|
| α Simplex. Simple humid asthma. | Without any manifest cause or combination with any other affection. |
| β Plethoricum. From plethora. | From plethora, or the suppression of some accustomed sanguineous evacuation. |
| γ Atonicum. From local atony. | From a debilitated and relaxed condition of the excretories of the air-vessels, as a consequence of chronic and neglected catarrhs, or of old age. |

Occasionally symptomatic, or consequent. The present species usually more obstinate than the preceding.

We also meet with examples of the humid as well as of the dry asthma, as a symptom or sequel of many other diseases ; as gout, hypochondrias, hysteria, paralyisma, and syphilis.

I have already observed, that the attack of the present species is more severe, as well as of longer duration, than the preceding ; as though the patient were contending with two hostile forces instead of with one—a diminished diameter of

* Pract. of Phys. Part II. Book III. Chap. VI. † MCCCXXXIV.

the vessels, and infarction from a surplus of viscid mucus: and thus both the exciting causes co-operate, which have been contended for singly by the leaders of opposite principles. I am much disposed to think, that this is frequently the case; and that, to a certain extent, both hypotheses are correct. That asthma occurs, as in the preceding species, without any increased discharge of mucus, is unquestionable; that it occurs with such increased discharge, is equally incontrovertible.

GEN. IV.
SPEC. II.

Asthma
humidum.
Reason of
this.

But whatever be the source of the aggravated distress endured in humid asthma, after some hours of suffering the patient feels less anxiety, breathes more leisurely and with less labour; and, with a growing freedom of expectoration, acquires general relief and tranquillity. Yet such is the irritable state of the affected organs, that even on the second day "no change of posture is made with impunity, and particular distress affects him if he engage in the fatigue of dressing whilst the stomach is empty. During the day, if no particular hurry occur, the breathing becomes generally more free till the evening: an inexperienced asthmatic even flatters himself that his disease is leaving him; but he finds, at the approach of night, that he must sustain a new attack. The paroxysm recommences with the usual symptoms, and the night is passed nearly as the former; but the sleep is more perfect, and productive of more relief. The third day the remission is more complete, there is some additional expectoration, and bodily motion is performed with less distress, but still with great inconvenience. After the paroxysm has been renewed in this manner for three nights, the expectoration generally becomes free; but there is no certain termination of the fit at a fixed period. However, except in particular cases, it goes off after a few days; and as the daily remissions become more perfect, the urine is higher coloured, and in smaller quantities; the expectorated mucus is more copious and digested; strength of pulse and vigour of action increase; and good humour again enlivens the mind."*

Diagnosis.

In TREATING asthma, our attention must be directed to the paroxysm itself, and to the nature of the constitution after the paroxysm has ceased; and, even during the paroxysm, to the character of the particular species under which the disease shows itself.

General
treatment.

Dr. Cullen, who, as we have already seen, regarded plethora and turgescence of the blood-vessels as the usual cause, recommends blood-letting in the first attack, and especially in young persons; with the use of acids and neutral salts, as employed by Sir John Floyer, for the purpose of taking off the congestion of the blood. Nevertheless bleeding demands a nice discrimination, and is rarely to be recommended in either species. The relief it affords, even in dry or convulsive asthma, is very temporary; and Dr. Cullen allows, that it cannot be persevered in without undermining the constitution, and laying a foundation for dropsy.

Bleeding.

Caution
required in
bleeding.

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.

Dr. Bree regards it as a doubtful operation in the first species, or that, to adopt his own language, produced by aerial irritation, and as always imprudent in the second. In this last, "I have repeatedly," says he, "directed it; but I have never had reason to think that the paroxysm was shortened an hour by the loss of blood: and I have often been convinced, that the expectoration was delayed, and that more dyspnœa remained in the intermission, than was common after former paroxysms. In old people, who have been long used to the disorder, it is certainly injurious."*

Purging, beyond the intention of keeping the bowels regularly open, has seldom proved beneficial. When, indeed, the disease is secondary, and depends evidently upon an overloaded liver or stomach, or some suppressed evacuation, active cathartics, and especially such as operate simply, will be of great use; and the increased action excited in the alvine canal will often take off the irregular action in the chest; but where the asthma is idiopathic, and especially where the constitution is infirm, as in old age, a powerful alvine irritation will exacerbate the spasm of the chest, instead of diminishing it.

Nauseating
and vomit-
ing.

In exciting nausea or vomiting, however, we may be less cautious; for each has often been found highly advantageous in both species of idiopathic asthma. The first, by diminishing generally the living power, and hereby relaxing the convulsive action; and the second, by changing the seat of the convulsive action, and at the same time determining to the surface. [This practice has the sanction of Riverius, Akenside, Sir John Floyer, and Laennec, who says, that it acts on the nervous system, and is often followed by an immediate alleviation of the paroxysm.†]

Blisters.

Blistering may also be made use of, but, like setons or issues, can only be of ulterior advantage, for the fit must be of far more than ordinary length if it continue till the blister has produced vesication. It may, however, go far to prevent or shorten a relapse on the ensuing night; and especially when the disease is connected with an asthmatic habit.

Coffee.

Sir John Floyer is said, during his residence at Lichfield, to have found great benefit in his own case by the use of very strong coffee. And the practice was afterwards followed up by Sir John Pringle, as he informs us, with equal success. "On reading the section on coffee, in the second volume of your Essays," says he in a letter to Dr. Percival, "one quality occurred to me which I had observed of that liquor confirming what you had said of its sedative powers. It is the best abater of the periodic asthma that I have seen. The coffee ought to be of the best Mocha, newly burnt, and made very strong, immediately after grinding it. I have commonly ordered an ounce for one dish, which is to be repeated fresh after the interval of a quarter or half an hour, and which I direct to be taken without milk or sugar.‡"

* Inquiry, &c. p. 245. † Laennec on Diseases of the Chest, &c. p. 418. 2d edit. ‡ See Percival's Philos. Med. and Exp. Essays, vol. iii.

Sedatives and antispasmodics, given alone, have rarely been attended with any decisive advantage. They have occasionally afforded relief in the first species, but have had little effect in the second; and, by heating the system unnecessarily, have often augmented and prolonged the paroxysm. Dr. Bree, in relating his own case, which was that of humid asthma, tells us, that, in the access of a paroxysm, he took four grains of solid opium, which produced nearly an apoplectic stupor for two days. A few hours after trying the opium, a most debilitating sickness supervened, with incessant efforts to puke. The labour of the respiratory muscles abated, but the wheezing evidently increased, accompanied with an intense head-ach and a countenance more turgid than usual; the pulse being at first strong and quick, and afterwards sinking into great weakness. The paroxysm showed itself four hours earlier than usual the next day. He tried it in smaller doses during several subsequent fits, but in no instance without great general mischief, and with little or no local benefit.

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.
Sedatives
and anti-
spasmodics.

Much of this deleterious effect may have depended on idiosyncrasy. Sedatives and narcotics, if employed at all, should be combined with diaphoretics. In this form, they often prove a very powerful remedy: and one of the best preparations of this kind is the compound powder of ipecacuan. An universal glow and diapnoë, as it has been called, or breathing moisture on the surface, are among the most favourable symptoms of the disease, under whatever form it makes its appearance. Antispasmodics and narcotics, as musk, castor, valerian, cardamine, camphor, and the fetid gums, may perhaps be employed successfully when the disease is chiefly dependent upon a morbid habit; but even here they will derive a great advantage from an union with diaphoretics, as the neutral salts, and small doses of ipecacuan, or antimonial powder.

Diaphoretics.

The hyosciamus has often succeeded as a narcotic where opium has failed: but, like the latter, it should not be trusted to by itself in either species of the complaint.

Hyosciamus, and other narcotics.

[Laennec conceives, that narcotics may act, not merely by lessening the necessity of respiration, but also by overcoming the spasm of the lungs. The following, he says, have been particularly approved of: opium, belladonna, stramonium, phellandrium aquaticum, aconitum, napellus, colchicum, tobacco smoked, or taken internally, cicuta, dulcamara, and hyosciamus. The cases, in which he particularly recommends their exhibition, are those seemingly attended with an extraordinary necessity of respiration, and a spasm of the lungs.

Besides narcotics, certain substances, which act powerfully on the stomach, or nervous system, have been tried, as the distilled water of lauro-cerasus, the nux vomica, tincture of cantharides, the arsenical solution, and the prussic acid. Laennec found the laurel-cherry water and diluted prussic acid ease the breathing, though less certainly, than narcotics.

Nux vomica; prussic acid, &c.

GEN. IV. The same, he says, is true of the nitric, sulphuric, and acetic
 SP. I. & II. æthers.*]

Asthma. Where the urine is small in quantity, and of a pale hue, and
 General particularly where the disease is connected with a pituitous or
 treatment phlegmatic habit, diuretics have been found serviceable. Dr.
 Diuretics. Ferriar combined them with opium.

Expecto- But as there is no discharge that promises such direct benefit
 rants. as that from the excretories of the bronchial vessels themselves,
 so is there no tribe of medicines on which we can place so much
 dependence as the expectorants, when judiciously selected and
 administered. In every kind of idiopathic asthma, these may
 be employed with advantage.

Fetid gums. Among the fetid gums, which have been employed for this
 purpose, ammoniac has acquired the greatest degree of popula-
 rity: but, its power is inferior to that of assafœtida, the virtue
 of which is to be judged of by the degree of its offensive odour.
 Both these, however, are apt to be too heating, except in very
 flaccid and phlegmatic habits; and it will hence be often neces-
 sary to soften their pungency by a saline medium, taking care
 not to irritate the bowels unduly. And where there is a con-
 siderable degree of irritability and much quickness of pulse,
 we may prefer several of the oleraceous, and especially the
 mucilaginous demulcents: but oily demulcents are always to be
 avoided.

Demul-
 cents.

Squills;

sometimes
 with opium.

Of all the medicines, however, which act on the excernents
 of the lungs, the squill is the most to be depended upon. It is
 indeed a stimulant of the excernent system generally; for there
 is no part of this system capable of resisting its power: and it
 is hence necessary to watch its effects upon the kidneys and in-
 testinal canal, and to attemper it with opium or some other
 guard, if it produce much influence in either of these ways;
 except, indeed, in the case of asthma connected with the phleg-
 matic habit, which is the only modification of the disease in
 which this collateral influence is found to be of advantage.
 Squills have also a peculiar tendency to stimulate the stomach,
 and produce nausea or vomiting; and it rarely shows much of
 an expectorating power till it has occasioned the former. But
 as these are advantageous to the disease in both species, and
 especially in humid asthma, we are not to discontinue it on this
 account, but only to moderate its use. Many practitioners, in-
 deed, employ it directly as an emetic medicine, and prefer it to
 ipecacuan. In asthma it may, in some habits, be allowed to su-
 persede it; but in no other disease that I recollect; for it is
 rougher in its action, and more offensive in its taste.

Seneka.

Where, however, the lungs seem to be affected only second-
 arily, and the source of the disease lies in an infarcted and tor-
 pid state of the liver or some other abdominal organs, squills,
 and indeed expectorants in general, will be found less service-
 able, than in idiopathic cases. And hence, we should prefer the
 seneka root, which has often been found of great success, after

* Op. cit. p. 416, 417.

calomel, or whatever other cathartic may be judged most proper, has been previously made use of. Seneka root, indeed, is in itself a sort of general evacuant; for while it increases very largely the discharge of mucus, it increases also the flow of perspiration and urine, and sometimes acts as an emetic and purgative.

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.

There is a tribe of medicines which are also found of essential benefit in many cases of both species of asthma, but with whose mode of action we are so little acquainted, that it has been explained on very different principles by different pathologists; I mean, the acids both mineral and vegetable. These principles we have not room to examine; nor is it necessary; since, if they be really beneficial, it is of little moment whether they act as sedatives in allaying irritation, or as tonics in invigorating the relaxed bronchial exhalants. The vegetable seem more efficacious than the mineral acids, probably because, in consequence of their being less corrosive, the patient can take them in larger quantity; and the vegetable acids, obtained by fermentation, seem more useful than the native.

Acids.

Yet these have rarely been given alone; for, by uniting them with diaphoretics, as small doses of ipecacuan, or with narcotics, the remedial power of each has been augmented; and the latter are not only rendered more efficacious, but are borne with less mischief afterwards. Sir John Floyer was in the habit of uniting the acetous acid with squills, and hence, indeed, the popularity which the vinegar of squills has preserved to the present day. Dr. Bree has employed both the vegetable and the mineral acids, but always in union with some other preparation. Thus in humid asthma, after emetics, he prescribes a draught composed of an ounce of distilled vinegar, and from one to three grains of ipecacuan in a sufficient quantity of pure water, to be taken every four hours, as a mean of determining to the surface of the body, and of promoting absorption and exhalation. And as a mean of taking off irritation and exciting the secernents of the bronchiæ, it may be also employed in nervous or dry asthma, and often with as good effect.

Acids combined with
other medicines.

In like manner, Dr. Bree has made use of the nitric acid in union with squills and extract of henbane; giving three grains of the henbane with six minims of the acid and ten of tincture of squills in the form of a draught, and repeating it every three or four hours during the paroxysm. And he tells us, that "Many patients, who had taken the most powerful antispasmodics have assured me, that none had been so useful; and two gentlemen now under my direction inform me, that it is the only medicine that has ever given them relief in the paroxysms."* I cannot say that I have found it thus pre-eminently serviceable; but it has often been of decided benefit. And I know of no medicine that succeeds so well in preventing the mischievous effects of opium, and even in adding to its sedative power; or that is so valuable an adjunct in almost all antispas-

* Inquiry, &c. p. 235.

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.
Bathing,
hot and
cold.

modic preparations, and especially where ether, camphor, and other terebinthinates are employed; or that tends so effectually to take off all excess of pungency from the more heating expectorants.

As simple relaxants are always hurtful in this disease, and only add to the debility, it is not to be wondered at that warm bathing should be also injurious. Cold bathing, as a tonic between the intervals, has much more to be said in its favour. Dr. Bree tried it in his own person, but did not obtain success. His was a case of humid asthma. But in the first species, and particularly where habit has given inveteracy to the recurrence of the paroxysms, and where the general constitution is vigorous, there is no single remedy likely to be of more value.

[In Dr. Wilson Philip's "Inquiry into the Laws of the Vital Functions," will be found various observations, tending to prove the utility of galvanism in one form of asthma.]

Galvanism.
Prophy-
lactic treat-
ment.
Tonics.

Wherever asthma may be supposed to be dependent upon plethora, tonics can have no claim to be employed, till after such a condition has been removed; and then, perhaps, the best medicine will be the mineral acids.

[When the asthmatic paroxysms have a strongly marked periodical character, cinchona, according to Laennec, frequently diminishes their severity, and sometimes stops them altogether.]

Peruvian bark is often found to overload the stomach, especially in dyspeptic patients, with whom I have found columbo agree better, occasionally combined with carbonate of soda. But the best tonics are the metallic oxydes, [and of these the subcarbonate of iron, given in doses from a scruple to a drachm, is praised by Dr. Bree and Laennec. The latter speaks particularly of its benefit in pallid relaxed habits, and both in the dry asthma and the nervous.*]

Gaseous
inhalations.

Inhalations cannot well be tried during the paroxysms, but they have been very generally had recourse to in the intervals, and have consisted of very different vapours. When pneumatic medicine was at the height of its popularity, much benefit was supposed to be derived from the use of oxygen and hydrogen gases. Dr. Beddoes was peculiarly attached to the former, and thus describes its effects with his constitutional warmth of expression:—"No sooner does it touch the lungs, than the livid colour of the countenance disappears, the laborious respiration ceases, and the functions of all the thoracic organs go on easily and pleasantly again." Yet, with all this high recommendation, few patients choose to be cured in this manner in the present day; oxygen gas is now rarely adverted to by asthmatics or their medical attendants; and the remedy, from having been extolled beyond its proper level, has fallen back into an unmerited disregard. Dr. Ferriar has spoken in more sober terms of the benefit of hydrogen in the first species; and I am induced to believe that a long perseverance in the use of this gas may often produce the effects he has ascribed to it; but it is

* On Diseases of the Chest, &c. p. 418.

rarely that I have seen it so decidedly useful as to ascribe the patient's recovery to this remedy, rather than to other means he had been employing at the same time.

GEN. IV.
SP. I. & II.
Asthma.

Warm aromatic fumes have been also tried; as prophylactics, obtained from various substances. The smoking of tobacco has very extensively been recommended; the leaves of the *scandix odorata* were at one time in still higher repute; but both have of late years given way to those of the *datura stramonium* or thorn-apple. Most of these contain a narcotic power, and whatever benefit they produce is hence, perhaps, chiefly derived: but either this narcotic power, or the stimulating power with which it is so intimately united, has at times been found to bring on a difficulty of swallowing.

General
treatment.
Fumiga-
tions.

Another process has lately been adopted in France, but of the issue of which we have not yet received any satisfactory information. It consists in a revival of the impregnated aqueous injections of Stephen Hales,* with a view of determining how far such impregnating materials may reach the lungs and be thrown off by the bronchial exhalants. MM. Magendie and Nysten have been chiefly engaged in these researches, and they have ascertained, that alcohol, ether, camphor, and most of the other volatile antispasmodics, together with the gases, are in this manner conveyed to the lungs, and transpire from the surface of their air cells.†

Impreg-
nated aque-
ous injec-
tions.

Issues, setons, and even cauteries, have been long in repute as useful drains or revellents; and under this character, are highly successful in the cure of asthma. And where the disease has appeared upon a sudden check of a cutaneous eruption, or a sudden cessation of any habitual evacuation, I can unite in this recommendation of Macbride‡ and Reidlin.§ Issues to this end, and indeed for all others, are most conveniently kept open, and produce the most salutary irritations, by small pieces of the bark of spurge-laurel or mezereon, both of which contain a very acrid matter; and the latter of which, more especially, has for this purpose been very generally employed in France, under the name of *écorce de Garou*.|| A lady, between fifty and sixty years of age, whom I have long been in the habit of attending, had several very severe fits of asthma, about three years ago, at the distance of ten days or a fortnight from each other. I discovered that she had been formerly subject, though at irregular periods, to slight bleedings from the hemorrhoidal vessels, which, for some months, had ceased to be renewed. With a view of exciting a vicarious action, I opened an issue in one of the arms, and irritated the rectum by small doses of aloetic cathartics. The issue discharged copiously for six weeks, during which time the patient continued free from all attack: I then suffered it to heal slowly, still continuing the aloes; and about a month afterwards was informed, that the

Issues and
setons.

Illustrated.

* Hæmostatics, ii. 74, 75. † Précis Élémentaire de Physiologie, tom. ii. p. 291. ‡ Med. Observ. and Inquir. vol. vi. art. ii. § Lin. Med. 1695, p. 91. || Essai sur l'Usage et les Effets de l'Ecorce de Garou, par M. Archange le Noi. Paris, 1767.

GEN. IV. habitual discharge had returned. She had no paroxysm after
 SP. I. & II. this for upwards of two years.

Asthma.

General
 treatment.

Cured by
 catching
 the itch.

M. Bonifex relates a case, in which a corpulent asthmatic patient, who suffered severely from frequent fits of this disease, was accidentally infected with the itch. As the eruption extended, his breathing became every day more easy; and, from the time that the contagion took place, he had no return of a paroxysm whatever. He was then desirous of being cured of the itch, and, for this purpose, went for several days successively into a cold bath. The eruption was hereby repelled; but he was immediately attacked with an asthmatic fit, which returned twice within the space of a month. M. Pontifex advised him to have recourse to his former cure, by using the bed-clothes of one infected with the itch. This advice he followed; a few days after which the scabid eruption made its appearance, when he was again perfectly liberated from his asthma.*

Diet.

The diet should be light and cordial without being stimulant, and the food be of a solid, rather than of a liquid kind. All flatulent fruits and vegetables should be avoided; but oranges, the alliaceous esculents, and the aromata may be allowed in moderation. Hot liquors should be sedulously abstained from; and the beverage consist chiefly of coffee, ginger-tea, and acidulated waters.

Where asthma is dependent upon some primary affection of another kind, it can only be effectually treated by removing, or palliating, the original disorder.

GENUS V. EPHIALTES.—INCUBUS.

Sighing, suffocative anhelation, with intercepted utterance, and a sense of some external weight pressing heavily on the chest: transitory.

Significa-
 tion of the
 generic
 names.

EPHIALTES, incubus, night-mare, which are the common names in Greek, Latin, and English, for the present genus of diseases, though not exactly of the same meaning, import a sudden sense of an oppressive and suffocative weight on the chest, threatening strangulation, and rendering the person attacked incapable of changing his position. Ephialtes, from *εφάλλομαι*, signifies "to leap upon;" incubus, from *incubo*, "to lie upon;" and the term *mare*, in our compound night-mare, embodies the looser idea contained in the Greek and Latin denominations, and signifies a hag, goblin, demon, or spectre; as though the oppressive weight were occasioned by some such hideous monster's abruptly leaping or lying on the chest; whence our old Anglo-Saxon name for the disease, *Elf-sidenne*, or elf-squatting; which is as significant as any of them.

The character of the genus will be found sufficiently expressed in the foregoing definition.

* Recueil d'Obs. de Médecine des Hôpitaux Militaires, par M. Richard de Hautesierck, &c. t. ii. 4to. Paris, 1774.

If the generic definition be correct, as I trust it is, there can be no doubt that ephialtes belongs to, or should be ranged in close connexion with, the family of anhelations, under which it was usually classed by the earlier writers; and indeed continued to be so till the time of Dr. Cullen, who has strangely removed it to that of *vesanie*, or mental derangements, putting it immediately after mania; reducing it from a generic to a specific station; and as singularly uniting it with *sleep-walking*, with which it has little or no connexion in cause or symptoms, as will be sufficiently obvious from comparing the account about to be given of the one disease with that of the other.

GEN. V.
Ephialtes.

Incorrectly
classed by
Dr. Cullen.

The history of the affection will easily lead us to the nature of its production. It appears most frequently in persons of an irritable or nervous temperament, and of a weakly constitution; particularly amongst those who are predisposed to hypochondrias or low spirits. Others, indeed, are occasionally affected by it, but more rarely, and perhaps in a less degree. It usually, though not always, occurs in the night, during a reclined position, and after great fatigue of body or mind, or a stomach disordered by indigestible food, or food taken in excess.

Appears
most frequently in
irritable
temperaments.

Usually in
the night-
time, after
mental or
corporeal
fatigue, or a
disordered
stomach.

Although, therefore, the symptoms of this complaint are to be taken from the actual state of the muscles and other organs of respiration, the exciting cause is to be ascribed, for the most part, to the actual state of the stomach, or the sensorium, or both:—more generally indeed to both, as the brain and the stomach are so much in the habit of associating in the same action.

Yet how comes it that the organs of respiration should be thus singularly affected by the state of the stomach and the sensorium, and chiefly so in the night, rather than in the day? The solution of the question may be found in the reasons we have already offered, why the paroxysms of asthma, or of exacerbating dyspnœa, should mostly recur under similar circumstances, and at the same period.

Why such
causes
should pro-
duce such
an effect.

Respiration is a semi-voluntary action. In firm health, the will, indeed, is seldom applied to for its aid: but the moment the moving powers of the chest labour under any degree of debility, the will instantly interferes, and by its stimulus compensates for the deficient energy.

Respiration
often assisted
by the
will.

Something like this applies to the state of the stomach, during the process of digestion. In healthful digestion, the ordinary action of the stomach is equal to its own demand: but the moment it labours under any degree of debility, or, in consequence of its being overloaded, or loaded with indigestible materials, its ordinary action is not sufficient, it becomes necessary that it should be supplied, not indeed by the will, but instinctively, or by the remedial aid of the living principle, with an additional flow of nervous energy to enable it to meet the excess of duty hereby imposed upon it.

Digestion
often assisted
by the
remedial
power of
instinct.

The surplus of sensorial power, under such circumstances bestowed upon the stomach, is taken from the general supply to the system at large, as from a common stock; every organ con-

The addition
of sensorial
power
thus bestowed

GEN. V. Ephialtes, ed upon the stomach, taken from the system at large: and hence from the lungs: which, in weakly habits, are still farther debilitated: and especially during sleep. Whence impeded respiration; and, from sympathy, frightful dreams, and nightmare. From reverry, or any other abstraction of the mind, it may occur also in the day.

tributing its proportion, and, amongst others, the lungs. And if this demand, on the part of a feeble or overloaded stomach, should occur in a system, in which the general weakness of the respiratory organs is considerable; if it should take place in a recumbent position, in which they have, at all times, less power of action than in an upright posture; and if, moreover, it should be exhibited during sleep, in which the will itself, and most, sometimes indeed all, the faculties of the mind are in a state of suspension, from a cause I shall hereafter have occasion to explain; almost every thing will co-operate to impede respiration, to lower the tone of the respiratory muscles, and consequently to excite in them irregular and spasmodic action; in one word, to lay a foundation for all the symptoms which characterize ephialtes: the mind sympathetically disturbed and hurried in the midst of sleep, imaging to itself, at the moment, from the terrible sensation induced, as terrible a cause for its production, and giving full credulity to the presence of a huge and hideous spectre, tyrannically squatted upon the chest, and striving to take away the breath.

Now, in reverry, the will, as indeed all the faculties of the mind, may be as abstracted during the day, as they are suspended in sleep during the night: and from the peculiar strength and vivacity of the train of ideas or mental emotions that constitute the reverry, the same sudden exhaustion may take place, and the same inordinate demand upon the common stock of sensorial power, distributed throughout the system at large, may be made upon every organ acting under a common bond of sympathy, as we have just contemplated during the influence of sleep. And the respiratory organs being thus, in the same manner, mulcted of a part of their ordinary influx of nervous power, the same complaint may take place in the one period as in the other; though, the body not being recumbent in the day, the lungs will not sustain so violent a struggle; and the intellect, from its being less passive than in sleep, not so strongly imposed upon. [Although the foregoing hypothesis, respecting the cause of incubus, displays much ingenuity, the editor need scarcely observe, that what is stated amounts to nothing more than conjecture, liable to the very same objections which have subverted most other theories on the subject. Were it true, hardly any dyspeptic person with weak lungs, who eats too freely, could ever escape an attack of nightmare after going to bed. Yet this is quite repugnant to common experience. The disorder has sometimes been imagined to proceed from a stagnation of the blood in the sinuses of the brain, or in the vessels of the lungs, or from too great a determination of blood to the head. The horizontal posture during sleep, and the pressure of the stomach upon the aorta in a supine position, have been fancied to be sufficient to produce an unusual distention of the vessels of the brain; while, by others, the weight of the heart pressing on the left auricle and large pulmonary veins, has been suspected to produce the oppression and sense of weight and suffoca-

tion in the breast.* As Dr. Whytt† has observed, however, if these opinions were true, every person that lies upon his back, especially after a full meal, ought to suffer a degree of nightmare. Dr. Bateman considered it probable, that the seat of nightmare was chiefly in the stomach. The sympathy of this organ with the head, heart, lungs, and diaphragm, he says, is so remarkable, that there can be no difficulty in referring the several symptoms of incubus to a disagreeable irritation of the nerves of the stomach. A heavy or flatulent supper undoubtedly aggravates the nightmare in persons predisposed to it. Persons are mostly attacked while lying upon their back, because in this position the viscera make greater pressure on the diaphragm, and inspiration is less easy. The nightmare takes place only in sleep, because the strange ideas excited in the mind, in consequence of the disordered feelings of the stomach, are not then corrected by the external senses; nor do we then, by an increased respiration, or other motions of the body, endeavour to shake off any beginning uneasiness about the stomach or breast. The nightmare generally occurs in the first sleep, and seldom towards the morning, because at the earlier period the stomach is more loaded with food, and digestion is less advanced. It may be remarked, however, that neither a horizontal posture, sleep, nor heavy suppers ever produce the nightmare, at least in any considerable degree, unless the person be already predisposed to the complaint by the particular condition of the nerves of the stomach. As far as practical considerations are concerned, there may not be any very important difference between our author's views and those of Drs. Whytt and Bateman, since he represents the imposition of too much work on the stomach as the exciting cause. And it is only in his *rational*, that he lets his imagination take a random flight. With respect to his hypothesis of the cause of the daymare, it may be noticed, that the case which he has inserted as an illustration of it, could not be connected with revery or abstraction of the mind, as it always took place *suddenly*, and at *regular periods*. Be this as it may, our author describes the two following species of the affection:]

GEN. V.
Ephialtes.

1. EPHIALTES VIGILANTIUM.
2. ————— NOCTURNUS.

DAY-MARE.
NIGHT-MARE.

SPECIES 1. Ephialtes Vigilantium.—*Day-Mare.*

Produced during wakefulness: the pressure severe, and extending over the abdomen: respiration frequent, laborious, constricted: eyes fixed: sighing deep and violent: intellect undisturbed.

THIS species is less frequently described by pathological writers, than the ephialtes of the night season. Rhodius,†

Less frequent than night-mare.

* See Bond, on Incubus, 1753.

† On Nervous Disorders, chap. 6.

‡ Cent. i. observ. 54.

GEN. V.

SPEC. I.

Ephialtes
vigilantium.

Illustrated.

however, Forestus,* and Sauvages,† have distinctly marked it; and a striking example of it occurred some years ago in my own practice.

Forestus gives a case that returned periodically every third day, like an intermittent fever. The patient was a girl nine years of age, and, at these times, was suddenly attacked with great terror, a constriction of both the upper and lower belly, with urgent difficulty of breathing. Her eyes continued open, and were permanently turned to one spot; with her hands she forcibly grasped hold of things, that she might breathe the more easily. When spoken to, she returned no answer. In the mean time the mind seemed to be collected; she was without sleep; sighed repeatedly; the abdomen was elevated, the thorax still violently constricted and oppressed with laborious respiration and heavy panting: she was incapable of utterance.

Makes an
approach
towards
ecstasis and
catalepsy.

This case seems to be founded upon a highly irritable or spastic diathesis, and makes some approach towards ecstasy and catalepsy; but, with that intolerable weight on the chest which peculiarly marks ephialtes. No exciting cause is stated. A predisposing cause I have already hinted at, and shall briefly advert to the treatment under the ensuing species.

SPECIES II. Ephialtes Nocturnus.—*Night-Mare.*

Produced during sleep and interrupting it with violent struggle and tremor; the pressure on the chest seeming to be that of some hideous monster, or phantom.

Usually
preceded by
some fearful
dream.

THE sensation is said to be frequently preceded by some fearful dream, as that of an implacable enemy, known or unknown, in close pursuit of the dreamer, from whose grasp he feels incapable of escaping; or of exposure to some overwhelming danger by sea or land, as that of falling from a steep precipice; or struggling, amidst the ruins of a shipwreck, with rocks and breakers that threaten to dash him to pieces every moment. This I believe is often the case; and particularly when the state of the brain, rather than that of the stomach, forms the exciting cause.

Not always
accom-
panied with
hideous
ideas.

The attack, however, appears to be sometimes slighter, and unaccompanied with such fearful scenes of desperate adventure, or the machinery of hideous and appalling demons or monsters: for Fortis gives the case of a young woman, who, during the paroxysm, supposed herself to be pressed upon by a man who was very far from being disagreeable to her; yet awoke from this imaginary concubinage with the usual sense of oppression, the voice and breath interrupted, great anxiety, and the face covered with sweat.‡ And similar cases, accord-

* Lib. x. obs. 52.

† Class v. ord. I. Anhelationes Spasmodicæ. gen. I.

‡ Sauv. Nosol. Meth. i. 631.

ing to Craanen, Heurnius, and Forestus, have occurred to men as well as to women. While we are told by Pliny, that the oppression in his day was ascribed to the sports of fauns, an idea rather pleasing than hateful to the imagination; and that the disease was hence denominated faun-gambols, *ludibria fauni*.

The treatment may be stated in a few words. The mind and body should be kept free from all undue fatigue and commotion, and the diet be light, especially towards the evening. The action of the bowels should be kept regular; and perhaps, as Dr. Darwin recommends, a mattress or harder bed than usual should be used, and an alarum clock hung up in the room, so that the sleep may be interrupted at short intervals. [The patient should sleep with his head raised on high pillows, and lie on his side. If the functions of the stomach be much disordered, the directions already given for the relief of dyspepsia and other affections of this organ, should be followed.] These plans will supersede the use of the feeble medicines which were formerly in vogue for the cure of nightmare, as saffron and peony; and will render superfluous all farther enquiry into a subject which once exercised the pen of the learned, whether the latter was or was not a specific in the form of an amulet.

GEN. V.

SPEC. II.

Ephialtes nocturnus.

Among the Romans ascribed to the gambols of fauns.

Medical treatment.

GENUS VI. STERNALGIA.—SUFFOCATIVE BREAST-PANG.

Violent pain about the sternum, extending towards the arms; anxiety, difficulty of breathing, and sense of suffocation.

THIS disease is described by modern writers under the names of *angina pectoris*, *syncope anginosa*, *asthma dolorificum*, or *arthriticum*, *orthopnœa cardiaca*, and various others of a similar import, that clearly discover its relationship to the genera which have just passed in review before us. It has characters, however, sufficiently marked to separate it from all of them, and particularly from those under which it has hitherto been ranked as a species or subdivision. And I have in consequence been under the necessity of giving it a new denomination, as well as of assigning it a new place: and hence the above name of STERNALGIA (ΣΤΕΡΝΑΛΓΙΑ); a compound importing "pain about the sternum," which is a striking pathognomonic symptom, if not the leading feature of the affection. It is here it differs essentially from syncope and asthma, neither of which terms, therefore, ought to have been appropriated to it; while it has still less connexion with angina in its common sense of quinsy, although this is the name, by which, from the time of Dr. Heberden, it has been most frequently denominated.

Synonyms.

Present name.

M. Brera, an Italian physician of deserved eminence, but

Synonyms.

GEN. VI.
Sternalgia.
Suffocative
breast-pang.

whose work* the author was unacquainted with till after the first edition of the present, has entitled it *sternocardia*, and M. Portal has preferred this term to *angina pectoris*. Its chief objection is a derivation from two distinct organs, as the seat of disease.

The genus offers us two species :

1. STERNALGIA AMBULANTIUM.

ACUTE BREAST-PANG.

2. ————— CHRONICA.

CHRONIC BREAST-PANG.

SPECIES I. Sternalgia Ambulantium.—*Acute Breast-pang.*

Supervening suddenly during exercise ; with tendency to syncope : relieved by rest.

Not known
in early
times.

It is singular, that there is no description which will fairly apply to this genus under either of its species, in any of the writings of the Greek, Roman, or Arabian authors that have descended to us. Some few passages have been quoted as possibly referring to it ; but, on examination, they will be found too general for the purpose, or evidently intended for some other affection. Such particularly is the *asthma pneumodes* of Aretæus, referred to by Swediaur, who has distinguished the disease in his Nosology by the name of *Pnigophobia*. And hence, considering the minuteness with which many of the writers thus adverted to have followed up all the morbid affections of the human frame, and the accuracy with which they have described them, the most reasonable conclusion is, that, like rickets and several other diseases, it was not known to them, or, in other words, was not in existence.

First glances
at it.

The first glances at it, which we are any where capable of tracing, are to be met with occasionally in the works of Morgagni,† and somewhat more distinctly in the *Consultationes Medicæ* of Hoffman. Dr. Letherland has followed up the enquiry with a curious spirit of research in the Edinburgh Medical Commentaries,‡ and has quoted a passage from the works of Potter, which renders it highly probable, that this writer was well acquainted with, at least, the first species of the genus, and was aware of its being often fatal. Potter's description of the disease is as follows: "Respirandi difficultas quæ per intervalla deambulantibus incidit;—sic ut plurimum derepentè moriuntur."§ But it is to the late Dr. Heberden that we are indebted for the first full and perspicuous account of sternalgia, or, as he calls it, *angina pectoris*.||

First clearly
described
by Heber-
den.

Dr. Cullen has not noticed the complaint either in his Nosology or in his First Lines ; but he has entered it with the un-

* Della Sternocardia. Verona, 1810. † See especially Epist. xxiii. art. 8, 9. ‡ Vol. iii. p. 180. § Poterii Op. Cent. 3. No. 22. || See Med. Trans. vols. ii. and iii.

satisfactory name of *angina pectoris* in his "Catalogue of Omitted Diseases."*

GEN. VI.
SPEC. I.

It has, however, been minutely described and well illustrated, both historically and practically, by many modern writers of established reputation, as Dr. Fothergill, Dr. Duncan, Dr. Percival, Dr. Darwin, Dr. Macbride, Dr. Hamilton, Dr. Haygarth, and Dr. Parry, most of whom have accompanied their descriptions with a speculative enquiry into the causes of the complaint.

Sternalgia
ambulantium.

And since
by numerous
writers.

Sternalgia rarely attacks the young, or those who are under five-and-forty or fifty years of age. Persons with short necks, inclined to corpulency, or of a gouty temperament, and especially when indulging a sedative life, are peculiarly predisposed to it. The form it first assumes is commonly that of the present species, by far the most severe, and, as Pöter correctly observes, the most frequently fatal: for when the constitution has been for some time habituated to the paroxysms, though it often becomes greatly debilitated by them, and the paroxysms themselves increase in duration, it passes through the attack with less violence and immediate danger.

Pathology.

The present
species more
fatal than
the chronic.

The incipient assault is usually felt while the patient is walking, and especially if he happen to be walking soon after eating, or during the process of digestion. He complains of a new and painful sensation in his breast, spreading up to his arms. At first, perhaps, this extends no farther than to the insertion of the deltoid muscle, and more commonly on the left side than on the right; but it soon winds its way to the elbow, wrist, and fingers' ends. In this incipient state, he sometimes loses the pain suddenly and entirely by merely standing still. Yet it rarely continues more than from half an hour to an hour, even under its most severe assault, and where it proves fatal. There is sometimes connected with it a strong feeling of flatulency at the stomach, with momentary ease on eructation. The face moreover is often pale, and the body bathed in perspiration.

Symptoms.

Whatever exercise the patient is engaged in when the paroxysm attacks him, he feels that a perseverance in it would produce a total suspension of living power: and hence if he be walking, and especially against the wind, he turns from the wind and stands still; when, if the complaint be slight, and, in its infancy, it soon vanishes.

In one instance, a patient thus attacked, and who was distinguished for great firmness of mind, had the resolution to continue walking, and found the pain go off after it had affected him from five to ten minutes.† If by a like degree of courageous effort, the patient, in struggling for breath, be able to overcome the constriction, he will continue able through the remainder of the fit to make a deep inspiration, though accompanied perhaps with sighing and some difficulty of expiring his breath. In other instances, however, an equal degree of firm-

In slight
cases con-
quered by
firmness of
mind.

Firmness of
mind some-

* "Catalogus Morborum à nobis omissorum, quos omisisse fortassis non oportebat."

† Parry, Treatise on Angina Pectoris.

GEN. VI.
SPEC. I.

Sternalgia
ambulan-
tium.

times ex-
erted in
vain.

A habit of
return soon
produced.

Pulse not
greatly va-
ried.

The cause
obscure :

and hence
ascribed to
a morbid
state of
very differ-
ent organs.

ness has been exerted in vain. In most cases, the pulse, during this contest, varies but little, yet it is sometimes quickened, and sometimes intermits; while, in a few instances, the heart palpitates considerably, though less so than in the chronic species.

A habit of return is soon induced after a few fits have paved the way; and when this is effected, the action of walking is not necessary for its production, for it will sometimes be brought on by the most trivial circumstances, as coughing, swallowing, going to stool, or a slight disturbance of the mind. And, in this case, the first species becomes converted into the second. "One," says Dr. Heberden, "has told me that this complaint was greatest in winter; another, that it was aggravated by warm weather; in the rest, the seasons were not suspected of making any difference."* The pulse is not only little affected, as already observed, during the paroxysm, but even in the intervals; being, for the most part, only a little quickened, and seldom exceeding eighty strokes in a minute; in one instance, even where the semilunar valves of the heart were afterwards found ossified, and the ossification had extended to the aorta itself, the pulse, though small, never exhibited irregularity.† Yet, in a few instances, I have found it not only irregular but intermittent; and intermittent for some weeks after the paroxysm had ceased to return. In others, it has been strong and vibratory.

The cause is very obscure, and the more so as the disease has often been found in persons labouring under different sorts of structural derangement about the heart, or in one or more of the organs of respiration, to which it has been ascribed, as soon as such derangements have been discovered; while, in other cases, nothing of the kind seems to have existed. Thus the cartilaginous portions of the ribs have sometimes appeared ossified on examination after death; sometimes the semilunar valves of the heart; and sometimes the coronary arteries: and hence Dr. Wall has ascribed the disease to the first or second of these morbid changes,‡ and Drs. Heberden and Parry to the third,§ who have been followed by Burns and Kreysig. Dr. Cuming found the heart itself double its natural size, with some kind of morbid change in several of the surrounding organs.|| Dr. Haygarth, on one occasion, found the mediastinum in a state of suppurative inflammation, and has hence regarded this as the cause;¶ while, as the pericardium has sometimes evinced concretions of blood, Dr. Hooper and others have referred the disease to this affection.** Dr. Hosack conceives,†† "that it most frequently arises from a plethoric state of the blood-vessels, more especially from a disproportionate accumulation of blood in the heart and large vessels;" an opinion more in accordance

* Medical Transactions, vol. ii. p. 61. † Id. Letter from Dr. Wall, vol. iii. p. 16. ‡ Medical Transactions, vol. iii. art. ii. § Treatise on the

Syncope Anginosa, commonly called Angina Pectoris. || Case of Diseased Heart, &c., Dublin Reports, vol. iii. ¶ Medical Trans. vol. iii. art. vi.

** Mem. of the Med. Soc. of Lond. vol. i. 19. 21. †† Americ. Med. and Phil. Regist. vol. ii. p. 366.

with the observation of Dr. John Forbes, than any of the others.* Dr. Darwin mentions it as a sort of asthma, producing a cramp of a peculiar kind in the diaphragm, or the other muscles of respiration; while a very large number of pathologists, among whom may be mentioned Elsner,† Benger,‡ Dr. Butter,§ and Dr. Macqueen,|| have endeavoured to account for it as a particular species of gout: and hence Dr. Berger attacked it with gum guaiacum, which, in his paper upon this subject in the Copenhagen Transactions, he asserts to have been particularly serviceable. Dr. Latham has, in various instances, found it in persons who, possessed of sound chests and apparently untainted constitutions,¶ were affected with enlargements of the abdominal viscera, or other diseases seated in these organs.

GEN. VI.
SPEC. I.
Sternalgia
ambulan-
tium.

That there is a violent and painful constriction of some of the muscles about the sternum during the existence of the paroxysm, and that respiration is hence greatly impeded, is unquestionable; and that many of the above misformations of structure, or constitutional habits, may occasion a predisposition to sternalgia, is highly probable; but they give us little or no information concerning the cause that immediately produces it; while it is by no means unlikely, that several of these morbid changes, thus brought forward as causes, are themselves only effects of so laborious and perilous a struggle. And hence we cannot, I am afraid, in our present defective knowledge of the physiology of the disease, do more than adopt the modest opinion of Dr. Bergius and Dr. Heberden, and regard it as dependent upon a cause that has not yet been traced out, but which does not seem to originate necessarily in any structural derangement of the organs affected.

Many of these are, perhaps, predisposing causes: yet some of them may be effects.

Hence not necessarily dependent on structural arrangement.

The variable state of the pulse, and the occasional palpitation of the heart, are best accounted for by supposing some such structural disease as we have just seen occasionally exists there. Yet even these symptoms may depend upon the habit or idiosyncrasy, and appear to have occurred, in a few instances, in which dissection has discovered no such manifest local cause. So far as I have witnessed the disease, it has commenced in the respiratory muscles, with a suffocative struggle, and tense constrictive pain: and it has not been till a minute or two afterwards, and where the spastic action has extended in different directions, that the pulse has varied, or palpitation ensued: as though the primary seat of disease was in these muscles, and the heart was only affected secondarily.

Affection of the respiratory muscles prior to that of the heart.

[Professor Laennec considers *angina pectoris* as a variety of neuralgia of the heart. The doctrine of the disease being always the effect of some organic affection of this viscus, he says, is far from being correct. He has known many individuals, who suffered a few very severe but short attacks of it, and then

Laennec's view of the nature of the disease.

* See note in transl. of Laennec on Diseases of the Chest, 2d edit. p. 692.

† Abhandlung über die Brustbränne. Königsburg. ‡ See Algem. Deutsche, Bibl. xxxvi. 125. § Treatise on the disease commonly called Angina Pectoris, Lond. 1791. || Lond. Med. Journ. vol. v. ¶ Medical Transactions, vol. iv. art. xvi.

GEN. IV.
SPEC. I.
Sternalgia
ambulan-
tium.

had no farther return of it. On the other hand, he admits, that it frequently accompanies organic diseases of the heart. He has examined several subjects, whose cases were attended either with hypertrophy, or dilatation of the heart; but in none of these instances were the coronary arteries ossified. He conceives, that the site of the disorder may vary. When there is pain both in the heart and lungs, the affection may be chiefly situated in the pneumo-gastric nerve; when there is merely a sense of stricture in the heart, the disorder may be in the nervous filaments, which the heart receives from the great sympathetic nerve. Other nerves are also simultaneously affected by sympathy, or direct anastomosis.*]

Mode of
treatment
doubtful.

Where the real nature of the disease is thus doubtful, and its causes thus obscure or variable, its best mode of treatment must be equally uncertain; and though I willingly join with Dr. Heberden in thinking, that we ought not to despair of finding a cure, I am afraid we have not yet found it.

Venesection
useful in
certain cases
only.

Where the temperament is plethoric, or the heart is evidently implicated in the affection, bleeding will often afford some relief. But, in the simplest cases of the complaint, where the pulse is little disturbed, and the heart without palpitation, the use of the lancet has proved injurious, rather than beneficial: and purging has been of as little avail. Antispasmodics and cordials, and especially wine, palliate the symptoms for a few minutes; but afterwards lose their virtue.

Cordials
and anti-
spasmodics
only palli-
ate.

Recumbent
position.
Emetics.

The mode of treatment, which I have found most successful, consists in putting the patient immediately in an inclined, rather than a recumbent position, with his head raised high. He should instantly take an emetic of whatever may be given most expeditiously, though the antimonial preparations form the best medicine for this purpose, as producing a longer action. As soon as the patient rejects, he may be allowed a little warm water, administered to him sparingly. The diaphoresis, hereby induced, should be assisted by a moderate warmth of bed-clothes, and particularly by placing the patient between blankets; and if the constrictive pain or difficulty of respiration still outlast the sickness, opium intermixed with ether, camphor, or other diffusible antispasmodics, should be employed pretty freely. And I may here observe, as a general rule, that, where the common forms of opium, as the extract, wine, or tincture, are found to affect the head, the Lancashire or Cheshire preparation of it, known by the name of *Black Drop*, which is a solution of this drug in verjuice, with, apparently, some portion of rectified spirit, and, certainly, a liberal combination of aromatics, seems to have less tendency to excite nausea and head-ach afterwards; and, from its being nearly double the strength of the ordinary laudanum, may be used in a much smaller quantity. Mr. Batley's well known form will also in many cases succeed as well.

Diapho-
resis.

Opium.

Black drop.

Intervals
may be

But it is in the intervals of the fits that medical skill and in-

* See Laennec on Diseases of the Chest, &c. 2d ed. p. 630.

genuity are likely to be most efficacious. If we find the complaint connected, as it often is, with a morbid diathesis of any kind, as that of gout, with the sudden suppression of any habitual discharge, as that of the hemorrhoidal vessels, or a chronic affection of any other organ, as the heart, the stomach, or the liver, our attention must be immediately directed to what may thus prove a predisposing cause, which we must endeavour to palliate or remove, according to the nature of the cause we may be fortunate enough to detect. The bowels, in the mean time, must be kept gently open, and a freedom from relapse be secured at night for a week or a fortnight by an opiate pill, or the extract of henbane.

As the disease is greatly dependent upon a morbid mobility and weakness of the muscular fibres, either general or local, a tonic course of medicine and regimen should be instantly commenced, and unswervingly persevered in. The diet should be light; all flatulent foods and drinks be cautiously avoided; the hours be early, and the exercise indulged in be of the gentlest kind.

Arsenic, in small doses, is said to have been tried with advantage;* but I know nothing of its effects from my own practice; and should prefer the oxydes of many other metals, and particularly those of bismuth, copper, and iron, as more likely to afford a permanent and radical cure. Sir Gilbert Blane has briefly noted a case, in which the disease yielded to arsenic in combination with digitalis and mercury.†

Where the complaint is strictly idiopathic and uncombined, it has often been found to give way to some local irritation or vicarious drain. A sudden flow of blood from the anus has completely removed it. An ichorous or serous discharge from the same organ has proved equally successful; as has also an obstinate gleet. And it is hence not to be wondered at, that setons or issues should have been productive of equal service. The latter are to be preferred as the least troublesome; one should be opened in each thigh, and each incision should be large enough to contain two peas; which it would be better at first to make of the mezereon bark, as already recommended for the same purpose in asthma.

I have been informed, that some preparation of the *prunus lauro-cerasus*, given during the paroxysm, has proved rapidly successful; and from its power of augmenting action, while it diminishes irritability, it is possible, the information is correct; yet, without a high degree of skill and circumspection, so potent and rapid a poison must inevitably become a remedy far worse than the disease itself. The remedial or poisonous property is probably the prussic acid, which this plant is now well known to contain; as well as the blossom of peach-trees, the oil of bitter almonds, and other vegetables of the same smell. And hence, for the sake of greater accuracy, it would be better to

GEN. IV.
SPEC. I.

Sternalgia
ambulan-
tium.

employed to
most ad-
vantage.

Chronic
predispos-
ing causes
to be com-
bated.

Tonics.

Arsenic.

Vicarious
discharges.

Setons and
issues.

Prunus
lauro-
cerasus.

Concen-
trated prus-
sic acid.

* Alexander, Med. Com. Edinb. vol. v. p. 99.

† Medico-Chir. Trans. vol. iv. p. 136.

GEN. VI. employ the prussic acid of the chemist in its simpler and more
SPEC. I. concentrated state.

Sternalgia
ambulan-
tium.

[Laennec has a high opinion of the usefulness of magnetism, with leeches, blisters to the forepart of the chest, the cherry-laurel infusion, digitalis, or the fœtid gums; a mild regimen, and the warm or cold bath, according to the season of the year.*]

SPECIES II. Sternalgia Chronica.—*Chronic Breast-Pang.*

The paroxysms less violent, but of longer continuance: recurring frequently with great palpitation of the heart, excited by slight, and often unknown causes, and not relieved by rest.

Originates
often during
sleep, and
why.

FROM the observations, which have been thrown out at some length in treating of ephialtes and asthma, it is not to be wondered at that sternalgia should in many habits, where it has once taken a hold, be peculiarly disposed to recur when the body is recumbent, and particularly during sleep: nor even that, in some idiosyncrasies, it should, like the two complaints just alluded to, often originate in such a state of body.

Apt to be-
come chro-
nic.

In which
case re-
moved with
greater dif-
ficulty.

If, however, the first attacks do not prove fatal, the disease is often apt to become chronic; and to exhibit the symptoms that characterize the present species. The attack is now not only more easily brought on, but requires a longer period of time for its removal. Rest, even if it commence during exercise, has little or no effect, and the paroxysm has at times been protracted not only for some hours, but even for several days, without remission, and occasionally with a considerable degree of danger through the whole period. Yet it has occasionally continued to harass and weaken the constitution, without actually destroying it, for twenty years; and, in a few instances, has been known to cease spontaneously. In this species of the disease, we meet with far more instances of palpitation of the heart and irregular pulse than in the preceding: and not unfrequently these catenating symptoms become more manifest and distressing as the disease becomes more inveterate; as though the morbid state of the heart or its appendages were a result of sternalgia, instead of sternalgia being a result of the former. In Sir Gilbert Blane's valuable Table of Medical Cases occurring in his private practice, as contradistinguished from the diary of his public duty as physician to St. Thomas's Hospital, under the head of "Palpitation of the Heart and Angina Pectoris," we have the following remark: "In one of these cases, there was an extreme distress of breathing for five years, and the pulse fluctuated from twenty to thirty-two, never falling below the former, nor exceeding the latter. Nothing gave material relief. Leave was not obtained to open the body after death."†

Morbid
pulse and
palpitation
more fre-
quent in
chronic
cases.

Illustrated.

* See Laennec on Diseases of the Chest, 2d edit., p. 693.

† Med.-Chir. Trans. vol. iv. p. 136.

Dr. Fothergill in like manner asserts, not only that the pulse in his practice has been irregular and intermitting during the exacerbations, but that it has continued irregular and even inter-mittent when the patient has been free from pain and at rest.

Of the medical treatment and regimen, I have already spoken under the preceding species.

GEN. VI.
SPEC. II.
Sternalgia
chronica.

Treatment.

GENUS VII. PLEURALGIA.—PAIN IN THE SIDE.

Pungent pain in the side; difficulty of breathing; without fever or inflammation.

THE last genus of diseases which occurs under the present order, is that which has been usually denominated pleurodyne, for which pleuralgia is here adopted in its stead for the sake of simplicity. Both terms import pain or ache in the side; but as *algia* is a more common medical termination than *odyne*, and one alone is sufficient, a preference has been given to the former. On a nice and critical examination it would not be difficult to point out a shade of difference between *αλγος* and *οδυνη*, but no such critical distinction has been ever attended to by professional writers, and, as terminations to medical compounds, they are used convertibly, or as direct synonyms.*

The difficulty of breathing, noticed in the generic definition, depends altogether upon the acute ache produced by every attempt to inflate the lungs; and though negative characters ought to be avoided as much as possible, both in generic and specific definitions, it is necessary in the present instance to add, "without fever or inflammation;" since this is the chief feature by which pleuralgia, or "stitch in the pleura," is distinguished from "pleuritis, or inflammation of the pleura."

Difficulty
of breathing
on what de-
pendent.

Pleuralgia, or pleurodyne, is no more to be found in Dr. Cullen's Nosology, than sternalgia. Pain in the side is, in his opinion, never any thing more, than a mere symptom of some other complaint, most commonly rheumatism; and the example, which Dr. Cullen has thus set, has been followed by most of the later writers of our own country. There are two species, however, that have a fair claim to be regarded as strictly idiopathic. They do not often indeed constitute alarming diseases, but, so long as they continue, are peculiarly distressing; while the latter is often of long duration, and demands a considerable range of medical treatment.

Sauvages, therefore, is fully justified in forming a distinct genus of the complaints before us; and Macbride is more to be commended in following his example, than Cullen in departing from it. The two species are as follow:

- | | |
|----------------------|---------------------------|
| 1. PLEURALGIA ACUTA. | STITCH. |
| 2. ————— CHRONICA. | CHRONIC PAIN IN THE SIDE. |

* See the Author's Preliminary Dissertation to his Nosology, p. lix.

SPECIES I. Pleuralgia Acuta.—*Stitch.*

Pain sudden and temporary: supervening on muscular exercise: relieved by pressure.

GEN. VII. THIS species is found most frequent among boys, who are
SPEC. I. engaged in any violent exertion, and particularly in hard running. It is produced by too great and sudden a distention of the fine blood-vessels of the pleura from undue propulsion of the blood.

How re- It is relieved by a handkerchief, or any other tight bandage.
lieved. It gradually subsides on rest, or even slackening the pace. When this is not the case, bleeding and other evacuants are instantly necessary; together with warm relaxing liniments, and anodyne fomentations.

It is from this forcible distention of the minute vessels of the pleura that Van Swieten, Sauvages, and Macbride distinguish this species by the name of pleurodyne à spasmate; thus making a distinction between spasma and spasmus; and understanding, by the former, that voluntary stretching or straining which takes place in any vehement exertion, contraction, or extension of a muscle, as in striving, bearing heavy burdens, or running. In the language of M. de Sauvages, "Spasma non est spasmus, sed distractio, divulsio, qualis accidere solet à vehementi musculi nisû, contractione, extensione; ut inter luctandum, onera gestanda, currendum."*

Found as a This species is occasionally met with as a symptom in flatul-
symptom in ence, hysteria, and hypochondrias: in all these cases, howev-
other dis- er, though the disease or symptoms are the same, the exciting
eases: cause is very different. There is here, evidently, a nervous or
in which, irritable temperament, and a tendency to spastic action.

[With regard to the hypothesis of stitch depending upon an immoderate propulsion of the blood into the vessels of the pleura, it seems to be unsupported by any kind of evidence; nor is the editor aware, that mere distention of blood-vessels will in any other instance satisfactorily account for an attack of acute pain. The stitch, which is so common to young persons in their active sports, is generally a pain fixed nearly to a point either within one of the hypochondria, or under the false ribs, and is too circumscribed to admit of being explained by the supposed immoderate distention of the blood-vessels of the pleura, even if such distention could account for the sudden pain.]

SPECIES II. Pleuralgia Chronica.—*Chronic pain in the Side.*

Pain permanent: augmented by pressure: inability of lying on the side affected.

THIS species is more diffused than the first, and accompanied with a considerable degree of irritation; whence pressure, in-

* Nosol. Method. Cl. v. ~

Spasma,
how distin-
guished
from spas-
mus.

Found as a
symptom in
other dis-
eases:
in which,
however,
the exciting
cause is
different.

stead of diminishing, augments the pain. The cause is therefore of a different kind from any of those already noticed, and is perhaps most frequently to be found in adhesions of the folds of the pleura to each other, or to the intercostal muscles, or a thickening in some part of its extent, whereby the play of the respiratory organs is impeded, and a state of perpetual irritation, or a ceaseless tendency to irritation, is kept up.

This species has also often been produced by a fractured rib, or some other lesion of the chest; or by some internal malformation, or other structural disease in the organs of the same cavity. Dr. Perceval, in a note upon this species, appended to the volume of Nosology, refers to a case which once occurred to him, of pain in the left side, acute and obstinate, that baffled all remedies, local and general; and which was at length found to have originated from an aneurism of the aorta.

Chronic pleuralgia may also follow from an inflammation of the pleura; or from transferred gout or rheumatism. It is peculiarly apt to take place under every disease, which, by lowering the tone of the system, renders it generally irritable and subject to irregularity of action; as is the case in worms, syphilis, and phthisis. The opposite extreme of plethora has, moreover, not unfrequently been found to produce it.

Most of these, however, may be regarded as mere symptomatic affections. Among the genuine idiopathic cases may be mentioned, in the first place, those produced by external pressure, as habitually forcing the chest, in writing, against the hard edge of a desk; or, which still more frequently occurs, and is productive of far severer effects, by the absurd, though fashionable, use of tight stays, which, while they undermine the health, generally coop up and distort the chest into a shape equally ungraceful and unnatural. This barbarous custom cannot be too strongly inveighed against: for though the imprisoned young female may, by dint of habit, and where little exercise or exertion is required, be able to obtain a sort of triumph over the primary mischief of adhesions hereby produced; yet may she pave the way for an obstinate cough, phthisis, and lateral curvature of the spine; and should she escape these, she will still have other inconveniences to suffer as soon as she reaches a state of pregnancy.

In attempting either to cure or to palliate the present species of pleuralgia, we must direct our eye as nearly as possible to its cause. If the affection be symptomatic, we must combat the original disease. If idiopathic, bleeding from the arm will generally be found requisite, and freely, if we suspect plethora; but locally by cupping or leeches, if it be from the mischievous habit of dress we have just reprobated, and the constitution, as is mostly the case, be relaxed and delicate. Here also dry cupping has been frequently found serviceable. Under all circumstances, a loose dress should be insisted upon. Blistering will often afford relief, and the discharge should be rendered permanent; but a seton or an issue will generally succeed better

GEN. VII.
SPEC. II.
Pleuralgia
chronica.
Pressure
augments
the pain in
this species.
Common
causes.
Produced
by accident-
al injury, or
morbid
structure:

inflamma-
tion of the
pleura, or
transferred
gout:
worms, sy-
philis, or
phthisis:
sometimes
plethora.

When
strictly
idiopathic.

Tight stays:
their mis-
chievous
effects.

Treatment.

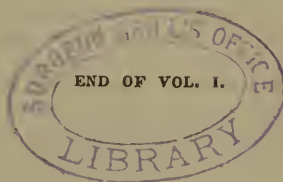
Bleeding
generally
requisite:
by the arm
or locally.

Dry cup-
ping.

Loose dress.
Blistering.

Setons and
issues.

GEN. VII. than a blister. Electricity by drawing sparks has also proved
SPEC. II. frequently of use. [Laennec's opinion of magnetism has been
Pleuraglia noticed under the first species, where the other remedies in
chronica. which he confides are also briefly mentioned.] Quiet rather
Electricity. than exercise is demanded, and the ablest course of internal me-
dicines will be that which is best calculated to take off irritating
Irritant and irregular action, as bark, valerian, snake-root, conium, and
medicines. the various preparations of the hop.



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